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Environment, Safety, and Health

Volume II

Part 21: Transportation

21.2
Onsite Hazardous Materials Packaging and Transportation Safety Manual

(Formerly H&SM C62)

Recommended for approval by the ES&H Working Group

New document or new requirements

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1. Introduction

1.1 Purpose and Objective

LLNL's Compliance Requirements

Lawrence Livermore National Laboratory (LLNL) at both its Main Site in Livermore, California, and at its Experimental Test Site—Site 300 near Tracy, California—must comply with a variety of applicable federal, state, and local laws; U.S. Department of Energy (DOE) Orders; and policies concerning the receipt, transport, identification, and handling of hazardous materials.

Applicable DOT Regulations

LLNL packaging and transportation operations are exempt from U.S. Department of Transportation (DOT) regulations when LLNL is transporting its own hazardous materials using its own personnel. Additionally, onsite packaging and transportation operations that are completely within the perimeter of access-controlled LLNL property are exempt from DOT regulations. The *U.S. Department of Transportation Regulations,* although not applicable to LLNL, may be considered as a source document.

LLNL Policy: Onsite Transfers of Hazardous Materials

Onsite transfers of hazardous materials must be made safely in a manner that protects the health and safety of all LLNL personnel, contractors, subcontractors, authorized visitors, and the public; and that prevents releases of these materials into the environment.

Purpose of LLNL Policy

This policy is designed to ensure that LLNL operations involving packaging and transfer of hazardous materials onsite shall be conducted to:

- Protect the health and safety of employees, subcontractor employees, and onsite visitors
- Protect the health and safety of the public
- Protect the hazardous materials during onsite transfer
- Protect the environment
- Comply with applicable federal, state, and local requirements.

1.2 The *Onsite HMPT Safety Manual*

Scope of the HMPT Safety Manual

The *Onsite Hazardous Materials Packaging and Transportation (HMPT) Safety Manual* establishes LLNL policy for the onsite transfers of hazardous materials, substances, and wastes within the geographically contiguous property of LLNL, including Site 300. Such onsite transfers shall be performed in a manner that minimizes potential risks to the health and safety of employees, the public, and the environment. The *Onsite HMPT Safety Manual*:

- Specifies responsibilities, requirements, and controls for the onsite movement of hazardous materials, substances, and wastes
- Provides internal policies for compliance with applicable DOE Orders and other regulations governing onsite transfers of such materials
- Provides guidance on packaging and transfer of hazardous materials, substances, and wastes onsite
- Provides documentation demonstrating safety of onsite transfers of hazardous materials, substances, and waste.

Onsite HMPT Safety Manual Control

The *Onsite HMPT Safety Manual* and each revision shall be:

- Issued and maintained by the HMPT Safety Assurance Office.
- Reviewed and approved by the HMPT Safety Committee members and other affected Laboratory organizations.
- Approved by the Associate Director for Plant Operations.

Revision Schedule

The *Onsite HMPT Safety Manual* will be reviewed and revised every two years. Minor revisions shall be made on an as-needed basis.

Governing Regulations

The *Onsite HMPT Safety Manual* addresses the following federal and state regulations concerning the onsite packaging and transfer of hazardous materials where applicable:

- Department of Transportation (DOT) Hazardous Materials Regulations, *Code of Federal Regulations (*CFR), Title 49, sections 100-180 (49 CFR 100-180)

- Resource Conservation and Recovery Act (RCRA) regulations, 40 CFR 115, 116, and 262
- *California Code of Regulations* (CCR), Title 13, Motor Vehicles (22 CCR 13).
- *California Code of Regulations* (CCR), Title 22, Chapter 30, Articles 9 and 11 (22 CCR 9 and 11).
- State of California Vehicle Code.

2. Site Description

2.1 Lawrence Livermore National Laboratory

Background

Lawrence Livermore National Laboratory (LLNL) is owned by the U.S. Department of Energy (DOE) and is operated by the University of California for the DOE. The Laboratory was established in 1952 to conduct research and development of nuclear weapons.

Since then, other major programs have included magnetic fusion energy, laser fusion, and laser isotope separation, biomedical sciences, environmental sciences, and applied energy technology. These programs perform research in chemistry and materials science, computer science and technology, biomedical sciences, engineering, and physics. LLNL also conducts a variety of project for other federal agencies.

Description of LLNL Sites

LLNL is located about 40 miles east of San Francisco at the southeast end of the Livermore Valley in southern Alameda County. See **Figure 2-1**.

LLNL consists of two sites. The Main Site is located 3 miles west of the city of Livermore adjacent to the site of Sandia National Laboratories, California, (**Figure 2-2**). Site 300 is 12 miles to the southeast in the Diablo Range near the city of Tracy (**Figure 2-3**).

Definition: Onsite

For hazardous materials packaging and transportation activities, or hazardous waste generation, "onsite" is any activity performed within the geographically contiguous private property owned by or under the control of LLNL.

2.2 Main Site

Location of LLNL Main Site

The LLNL Main Site occupies approximately 1 square mile bounded by East Avenue to the south, Greenville Road to the east, Patterson Pass Road to the north, and Vasco Road to the west.

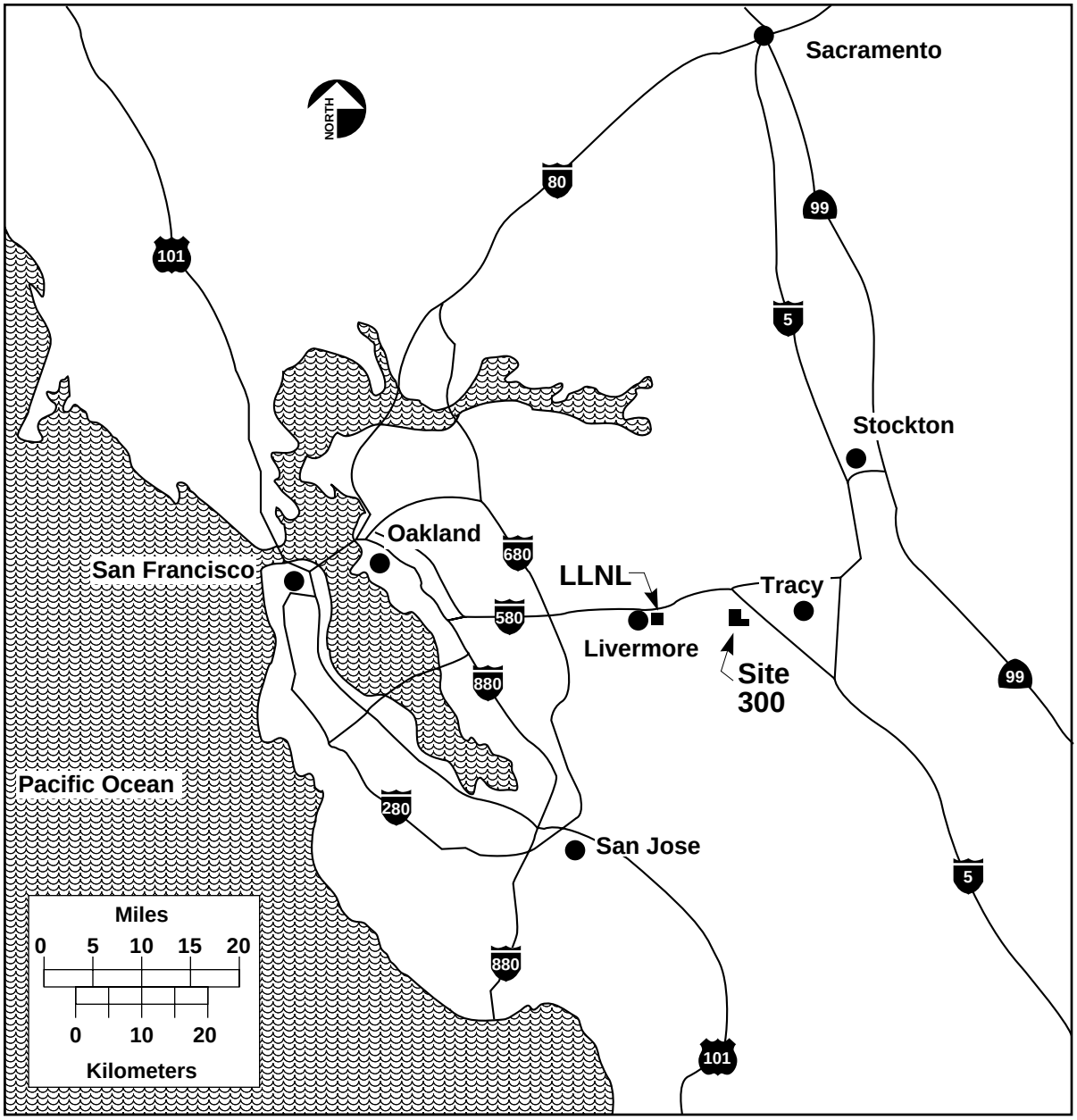

Figure 2-1. The regional location of Lawrence Livermore National Laboratory.

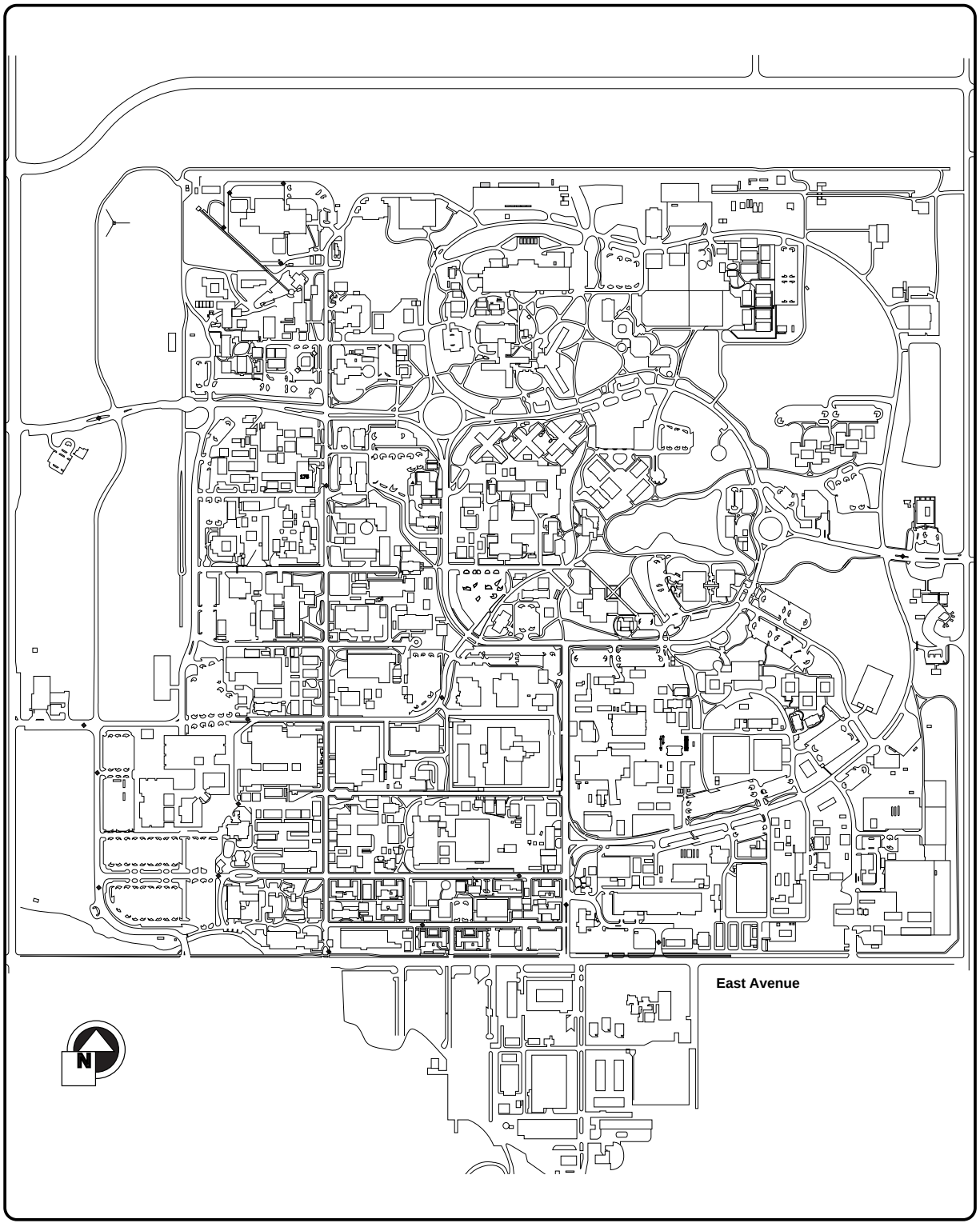

Figure 2-2. The Main Site of Lawrence Livermore National Laboratory.

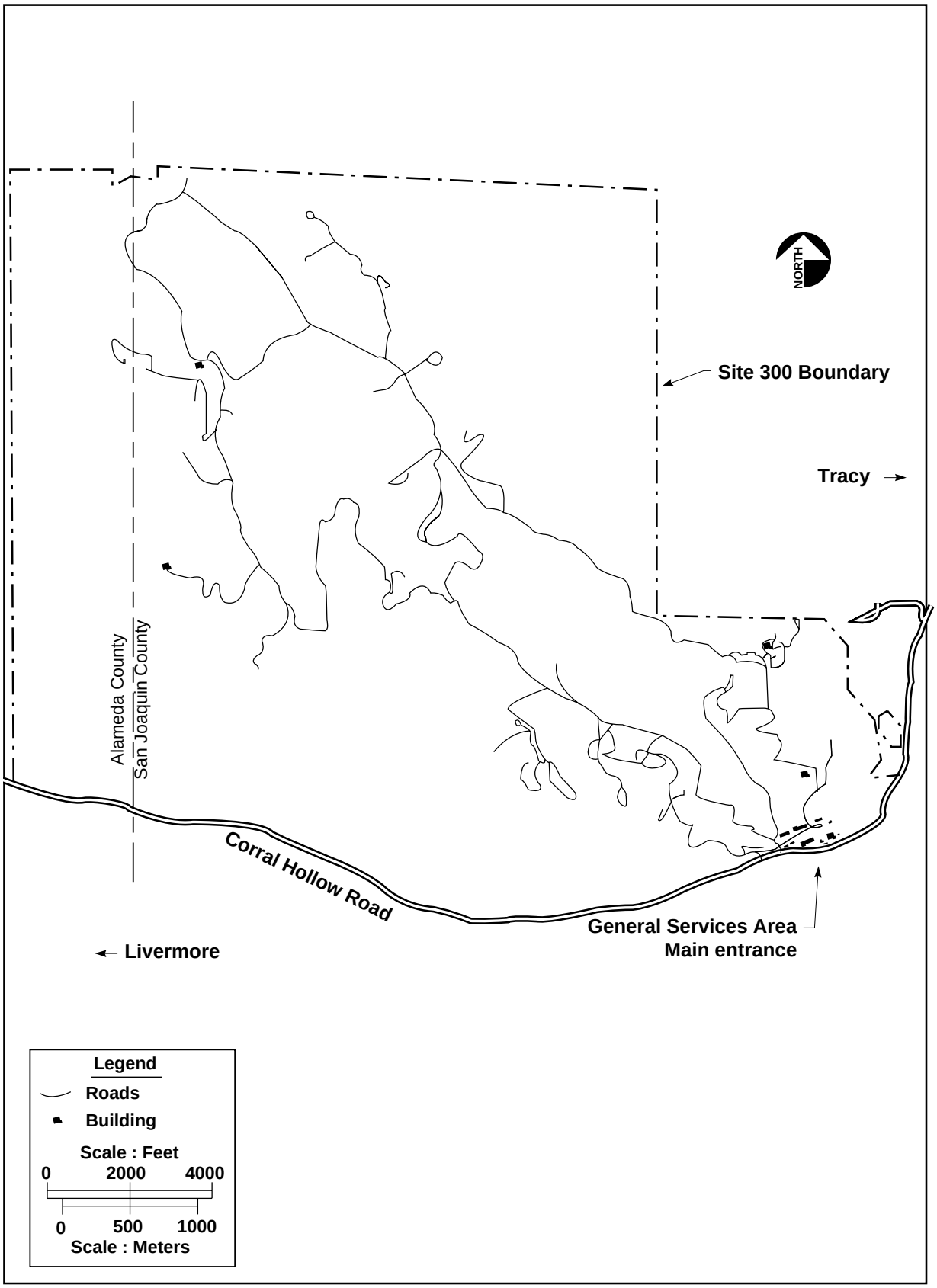

Figure 2-3. The location of Site 300 in the Diablo Range.

Access to Main Site

To gain access to the Main Site, employees, subcontractors, and visitors are required to obtain and display a security badge.

2.3 Site 300

Description of Site 300

Site 300, covering an area of about 10 square miles, is roughly rectangular in shape with its southern boundary being adjacent to Corral Hollow Road. About one-sixth of the site lies in Alameda County; the remainder is in San Joaquin County.

Access to Site 300

To gain access to the Site 300, employees, subcontractors, and visitors are required to obtain and display a security badge.

To assure the health and safety of personnel at Site 300, LLNL has developed a required safety class, HS-0095. To gain access beyond the Site 300 gate, visitors and LLNL personnel must have one of the following requirements:

- Successfully completed the HS-0095 class within the current calendar year
- Be escorted by an individual who has successfully completed HS-0095
- Made prior arrangements with the Site 300 Manager's Office.

Personal vehicles are restricted in all areas of Site 300 except for areas located near the entrance.

3. Categories of Hazardous Materials, Substances, and Wastes

3.1 Categories of Hazardous Materials

There are three LLNL categories of hazardous materials, substances, and wastes in the Onsite Hazardous Materials Packaging and Transportation (HMPT) Safety Program.

Category 1

Category 1 Hazardous Materials are "controlled materials" that also fit the definition for hazardous materials given in 49 CFR 171.8 (e.g., hazardous classified material, classified waste, non-waste quantities of fissionable and other radioactive materials, accountable nuclear materials, explosives, and nuclear components and special assemblies).

Category 2

Category 2 Hazardous Materials are unclassified hazardous or radioactive materials, substances, and wastes of negligible economic value, i.e., hazardous, explosive, and radioactive wastes.

Category 3

Category 3 Hazardous Materials are all hazardous material and substances other than those identified in Categories 1 and 2.

3.2 Explosives Storage Compatibility/Handling Control System

LLNL uses an explosives storage compatibility/ handling control (SC/HC) system to group explosives according to their form or composition, ease of ignition, and susceptibility to detonation. The control system facilitates the identification of the type(s) of explosives permitted in an approved explosives work area.

Below is a description of the explosives SC/HC system.

Definition of SC/HC System

The SC/HC system utilized by the United Nations Organization (UNO) system contains storage compatibility groupings (SCGs) and categorizes explosives by their form or composition, ease of ignition, or ease of detonation.

UNO Storage Compatibility Grouping

The UNO storage compatibility grouping is the handling control system used to control the group of explosives permitted in an approved explosives work area. Different types of explosives may be transported together or stored in the same storage magazine if they are compatible. The Storage Compatibility Mixing Chart in **Table 3-1** is used for determining compatibility and group mixing. The definition for each SC/HC group and examples of each are given below:

SC/HC Group A

SC/HC Group A consists of bulk initiating explosives that have the necessary sensitivity to friction, heat, or percussion (shock) to make them suitable for use as initiating elements in an explosive train. At LLNL, for purpose of procedural controls, a distinction is made between primary initiating explosives and non-primary initiating explosives. Examples of primary initiating explosives are lead azide, lead styphnate, mercury fulminate, and tetracene. Non-primary initiating explosives are dry forms of tetranitro tetrazacycloctane (HMX), trinitro triazacyclohexane (RDX) and pentaerythritol tetranitrate (PETN).

SC/HC Group B

SC/HC Group B consists of detonators and similar initiating devices that do not contain two or more independent safety features. Also, the group includes items containing initiating explosives that are designed to initiate or continue the functioning of an explosives train. Examples are detonators (exploding-bridgewire [EBW] and slapper detonators are excluded from this group only for storage and onsite transportation), blasting caps, small arms primers, and fuses.

SC/HC Group C

SC/HC Group C consists of bulk propellants, propelling charges, devices containing propellant with or without their own means of initiation. Examples are single-, double-, and triple-base propellants, composite propellants, rocket motors (solid propellant), and ammunition with inert projectiles.

SC/HC Group D

SC/HC Group D consists of explosives and devices that contain explosives without their own means of initiation. This groups includes explosives and ammunition that can be expected to explode or detonate when any given item or component thereof is initiated except for devices containing initiating explosives with independent safety features. Examples are wet HMX, plastic bonded explosves (explosives formulated with a desensitizing plastic binder), trinitrotoluene (TNT), and black powder.

Note: For storage and onsite transportation only, Group D includes EBW and slapper detonators plus assemblies, candle pads, and mirror pads with either EBW or slapper detonators installed.

SC/HC Group E

SC/HC Group E are explosives devices without their own means of initiation and containing or with propelling charge (other than one containing a flammable or hypergolic liquid). Examples are artillery ammuntion, rockets, and guided missiles.

SC/HC Group F

SC/HC Group F are explosives devices with their own means of initiation and with or without propelling charge. Examples are grenades, sounding devices, and similar items having an in-line explosive train in the initiator.

SC/HC Group G

SC/HC Group G consists of pyrotechnic materials and those devices containing pyrotechnic materials. Examples are devices that when functioning result in an incendiary, illumination, lachrymatory, smoke, or sound effect.

SC/HC Group L

SC/HC Group L are explosives or ammunition not included in the other-1SC/HC groups. This group includes explosives or ammunition having characteristics which do not permit storage with other similar or dissimilar materials. Examples are damaged or suspect explosives devices or containers, explosives that have undergone severe testing, fuel/air explosive devices, and water-activated devices. Also included are experimental explosives, explosives of temporary interest, newly synthesized compounds, new mixtures, and salvaged explosives until they have been established to be compatible with the original materials. Types presenting similar hazards may be stored together.

Note: Explosive residues from tests and partially reactivated explosives are also treated as Group L explosives.

SC/HC Group S

SC/HC Group S consists of explosives, explosives devices, or ammunition presenting no significant hazard. Explosives or ammunition, so designed or packed that, when in storage, all hazardous explosives effects are confined and self-contained within the time or package. An incident may destroy all items in a single pack, but must not be communicated to other packs. Examples are thermal batteries, cable cutters, explosive actuators, and other ammuntion items packaged to meet the criteria of this group.

Note: Explosves devices that are packed to meet this group requirements revert to their higher Hazard Class/Division and Compatibility Group when they are removed from the DOT-approved shipping container.

Storage Compatibility

Each explosive material and explosive device is to be assigned to an appropriate Hazard Class/Division and SC/HC group prior to being stored, handled, or transported. Different types of explosives may be stored together in the same magazine if they are compatible. The storage compatibility mixing chart (**Table 3-1**) is used for determining compatibility and group mixing. The possibility of chemical interaction should always be considered when placing any explosves in common storage.

Combined Storage of SC/HC Groups

Items from SC/HC Groups B, C, D, E, F, G, and S may be combined in storage if the net quantity of explosives in storage does not exceed 454.4 kg (1,000 lb) and if authorized by the Facility Safety Procedure (FSP) or Operational Safety Procedure (OSP) governing the magazine. Combining Groups B, C, E, F, G, and S in a net quantity greater than 1,000 lb is prohibited. Mixing SC/HC groups in storage requires the explosives to be packaged in approved containers with lids tightly secured.

For More Information

LLNL's explosives safety program is described in greater detail in the *LLNL Health and Safety Manual*, Chapter 24, "Explosives," and Chapter 24 supplements.

Table 3-1. Storage compatibility mixing chart

Groups	A	B	C	D	E	F	G	L	S
A	x	z							
B	z	x	z	z	z	z	z		x
C		z	x	x	x	z	z		x
D		z	x	x	x	z	z		x
E		z	x	x	x	z	z		x
F		z	z	z	z	x	z		x
G		z	z	z	z	z	x		x
L								x	
S		x	x	x	x	x	x		x

Notes:

1. An "x" indicates that these groups may be combined in storage. Otherwise, mixing is either prohibited or restricted according to the following paragraphs:
2. A "z" indicates that when warranted by operational considerations or magazine unavailability and when safety is not sacrificed, these groups may be combined in storage when approved by an OSP and stored in DOT-approved containers. Further, the magazine is limited to 1,000-lb net explosives weight (NEW).
3. No mark in a block indicates that combined storage is not permitted.

4. Organization of the Hazardous Materials Packaging and Transportation Safety Program

4.1 LLNL's Organization

Introduction

This section discusses the responsibilities of LLNL line management and organizations for setting and implementing policies related to hazardous materials packaging and transportation onsite of hazardous materials, substances, and wastes.

The Laboratory Director

The Director of LLNL is the Laboratory's Chief Executive Officer. He is also an official of the University of California. As Chief Executive Officer, the Director manages and is accountable for all Laboratory operations and activities, including the packaging and transportation of hazardous materials, substances, and wastes. The Director establishes Laboratory policy for the HMPT Safety Program.

Line Management

Laboratory line managers (Deputy Directors, the Laboratory Executive Officer, Associate Directors, and other senior managers) are responsible for assuring participation in the Onsite HMPT Safety Program and compliance by their organizations. Each line manager will:

- Provide resources for the required Onsite HMPT Safety Program activities by their groups
- Ensure that plans required to implement the Onsite HMPT Safety Program are maintained and used
- Assure that onsite material transfer services are appropriately utilized.

Associate Directors

Each major LLNL organization is headed by an appropriate programmatic Associate Director (AD) or Program Leader. The Director holds the ADs accountable for implementing LLNL policies as an integral part of their management responsibilities.

Associate Director of Plant Operations

The Laboratory's major institutional support organization is Plant Operations (see **Figure 4-1**). The Associate Director for Plant Operations oversees the effectiveness of the HMPT Safety Program, including responsibility for:

- Approving this *Onsite HMPT Safety Manual* and any major revisions
- Approving the HMPT Safety Quality Assurance (QA) Plan and any major revisions (See **Section 14.4**)
- Assuring that resources necessary for management of the Onsite HMPT Safety Program are provided
- Monitoring and supporting the HMPT Safety Committee in its management of the HMPT Safety Program.

LLNL Organizations Responsible for Hazardous Materials

The LLNL organizations responsible for the onsite packaging and transportation of the three categories of hazardous materials, substances, and wastes are:

- Materials Management Section (MMS) in the Applied Research Engineering Division has principal responsibility for packaging and transfer of Category 1 Hazardous Materials onsite (see **Section 7**).
- Hazardous Waste Management (HWM) Division in the Environmental Protection Department has principal responsibility for the transfer of Category 2 Hazardous Materials onsite (see **Section 8**).
- The Materials Distribution Division of the Procurement and Materiel Organization has principal responsibility for the packaging and transfer of Category 3 Hazardous Materials onsite (see **Section 9**).
- Plant Engineering Department is responsible for packaging and transfer of Category 3 Hazardous Materials required for normal Plant Engineering operations (materials of trade), assisting with special transfer, and performing vehicle inspections (see **Sections 5.5, 10.2,** and **13**).
- Programmatic personnel, researchers, and other users of hazardous materials and generators of hazardous waste are responsible for waste characterization and appropriate packaging of hazardous waste (see **Section 8.5**).

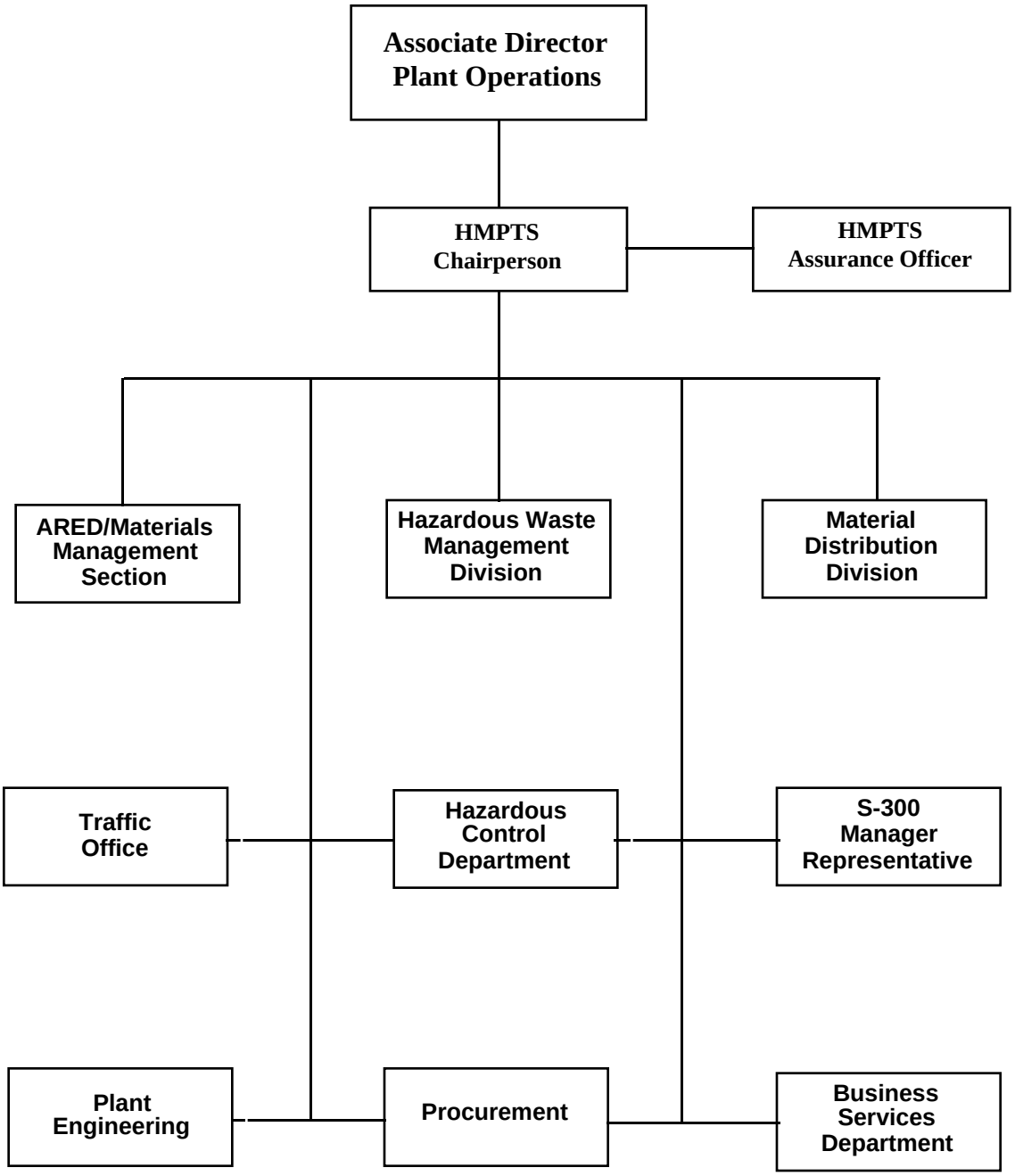

Figure 4-1. The HMPT Safety Program organization.

4.2 Hazardous Material Packaging and Transportation (HMPT) Safety Committee

Purpose of the HMPT Safety Committee

The HMPT Safety Committee ensures the full coordination, integration, and oversight of the organizations with responsibility for the packaging and transportation of hazardous materials. The current structure of the HMPT Safety Committee are shown in **Figure 4-2.**

Responsibilities of the HMPT Safety Committee

The HMPT Safety Committee oversees the HMPT Safety Program at the Laboratory. The Committee assures LLNL's compliance with regulations governing packaging integrity and transportation of hazardous materials, substances, and wastes, both onsite and offsite. It also assesses the effectiveness of the Laboratory's overall HMPT Safety Program.

Membership of the HMPT Safety Committee

The HMPT Safety Committee is composed of senior managers from the Materials Management Section, the HWM Division, and the Material Distribution Division. Other members are the HMPT Assurance Officer, representative from the Hazards Control Department and Plant Engineering, the Laboratory's Traffic Manager, and a management representative from Site 300.

Chairperson of the HMPT Safety Committee

The Committee chairperson reports directly to the AD for Plant Operations. The position is rotated among the senior management officials from the three principal HMPT organizations. The Committee Chair is assisted by a full-time Assurance Officer whose reporting relationship rotates with the respective committee chairperson.

Responsibilities of the HMPT Safety Committee Chairperson

The HMPT Safety Committee chairperson manages the HMPT Safety Committee and carries out the following responsibilities:

- Oversees the effectiveness of the Committee
- Issues the *Onsite HMPT Safety Program Manual* and any revisions
- Issues the HMPT Safety Quality Assurance (QA) Program and any revisions
- Apprises the AD for Plant Operations of the state of the HMPT Safety Program, including the Onsite Packaging and Transportation Safety Program

- Approves new and revised supporting procedures.

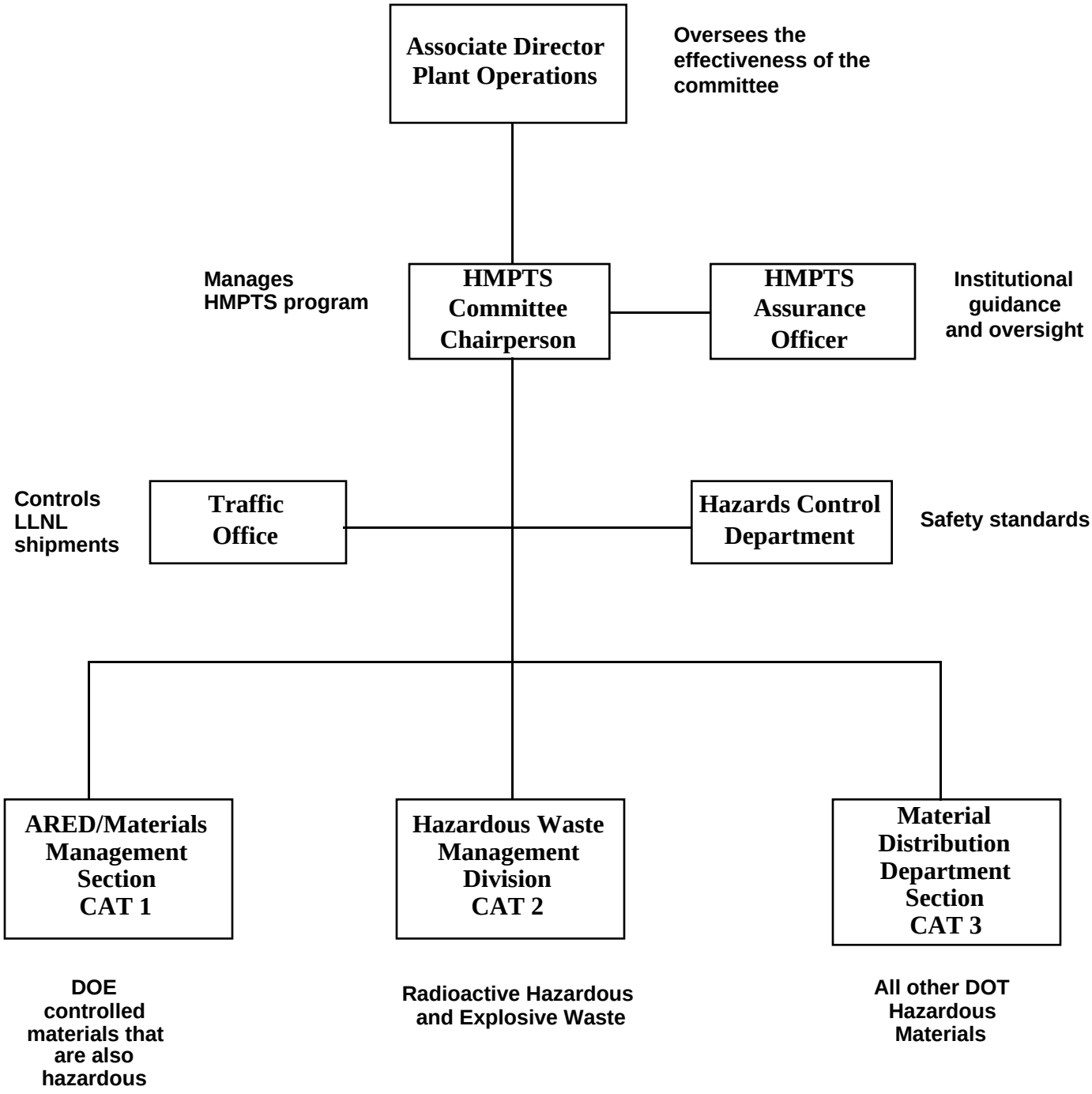

Figure 4-2. Functional responsibilities of the HMPT Safety Committee.

Meeting Schedule

The Committee meets once a month, or more often if needed to fulfill its responsibilities.

4.3 HMPT Safety Program Management

Management of the HMPT Safety Program

The HMPT Safety Committee manages the HMPT Safety Program (i.e., coordination, integration, oversight, and assessment of Program efforts by participants). HMPT Safety Committee members:

- •. Maintain cognizance of federal, state, local and LLNL requirements
- Ensure the requirements of this *Onsite HMPT Safety Manual* and the HMPT Safety QA Plan are in compliance
- Maintain this manual, the HMPT Safety QA Plan, and supporting Plans in HMPT Safety Committee procedures, as appropriate
- Manage internal and external QA appraisals and corrective actions of the HMPT Safety Program.

How the HMPT Safety Committee Carries out Its Responsibilities

To carry out its responsibilities, the HMPT Safety Committee:

- Initiates internal and external appraisals of all LLNL hazardous material packaging and transportation operations
- Tracks and assesses the effectiveness of any corrective actions taken to address identified concerns or deficiencies
- Oversees the preparation of a formal Onsite Hazardous Material Packaging and Transportation Program and effects the coordination and implementation of this program throughout the Laboratory
- Oversees the revision of the overall HMPT Safety QA Plan relating to hazardous material packaging and transportation
- Reviews and ensures full coordination of the individual QA plans within the three organizations responsible
- Serves as a reviewer for all newly established and/or revised procedures within the three organizations pertaining to the packaging or movement of hazardous material, if requested.

5. Principal HMPT Safety Organizations

5.1 Introduction

HMPT Safety Member Organizations

The functions of the HMPT safety organizations and other organizations providing support for HMPT Safety Program are described in this section and shown in **Figure 4-2**.

All member organizations of the HMPT Safety Program are responsible and accountable for different aspects of onsite hazardous materials packaging and transportation. The three principal members of the HMPT Safety Committee are the Materials Management Section (MMS), Hazardous Waste Management (HWM) Division, and the Materials Distribution Division (MDD). The Plant Engineering Department, the Hazards Control Department, and Site 300 also have representatives on the HMPT Safety Committee. The Traffic Manager is staff to the Material Distribution Division Leader. The HMPT Assurance Officer reports directly to the Committee chairperson.

5.2 Materials Management Section

MMS and Category 1 Hazardous Materials

The Materials Management Section (MMS) of the Applied Research Engineering Division is responsible for developing and maintaining guidance for the onsite packaging and transfer of Category 1 Hazardous Materials. MMS manages the material control and accountability system for the Laboratory's DOE controlled materials.

As part of the HMPT Safety Program, MMS is responsible for and authorized to:

- Provide packaging and transfer services for Category 1 Hazardous Materials
- Provide technical guidance to LLNL Programs and personnel for the packaging of Category 1 materials for onsite transfer
- Receiving and distributing Category 1 hazardous materials.

MMS Onsite Safety Responsibilities

For the onsite packaging and transfer of Category 1 Hazardous Materials, MMS:

- Establishes a system of procedures and controls for the safe and efficient transfer of controlled materials in the possession of LLNL
- Performs packaging and transfer of Category 1 materials
- Provides technical guidance to Laboratory personnel involved in packaging and onsite transfer operations for Category 1 Hazardous Materials
- Assures that controlled materials to be transported are correctly packaged for transfer
- Approves onsite transfer policies developed and issued by LLNL
- Provides overall management for accountability and day-to-day control of Category 1 Hazardous Materials
- Reviews operational and facility procedures governing packaging and onsite transfers of Category 1 Hazardous Materials
- Ensures safe operation of the commercial motor vehicles under its control
- Issues and implements the MMS QA Plan for Hazardous Material Packaging and Transportation (See **Section 14.4**)
- Trains MMS personnel.

5.3 Hazardous Waste Management Division

HWM Division and Category 2 Hazardous Materials

HWM Division in the Environmental Protection Department (EPD) is responsible for developing and maintaining guidance for packaging of Category 2 Hazardous Materials. HWM manages all hazardous, radioactive, explosive, and mixed wastes generated at all Laboratory facilities. Operationally, HWM Division staff processes these wastes for temporary storage, treats the waste, or transports the waste for either recycling or offsite disposal.

As part of the HMPT Safety Program, the HWM Division is responsible for and authorized to provide guidance on:

- Packaging to generators of Category 2 Hazardous Materials

- Transfer of Category 2 Hazardous Materials by the MMS
- Packaging and transfer of wastes that the HWM Division generates during waste processing activities.

HWM Division's Onsite HMPT Safety Responsibilities

For onsite packaging and transfer of these materials, HWM Division:

- Establishes a system of guidance and controls for the safe and efficient transfer of Category 2 Hazardous Materials in the possession of LLNL
- Provides technical guidance to LLNL personnel involved in packaging and onsite transfer operations of Category 2 Hazardous Materials
- Assures that Category 2 Hazardous Materials to be transported are correctly packaged for transfer before pickup
- Approves onsite transfer policies developed and issued by LLNL for Category 2 Hazardous Materials
- Provides overall management and day-to-day control of Category 2 Hazardous Materials at HWM Division facilities
- Reviews operational and facility procedures governing packaging and onsite transfers of hazardous wastes generated at HWM Division facilities
- Ensures safe operation of the commercial motor vehicles under its control
- Issues and implements the HWM Division QA Plan which addresses Hazardous Material Packaging and Transportation
- Trains HWM Division personnel
- Provides field Hazardous Waste Technicians to the Environmental, Safety, and Health (ES&H) Teams (see **Section 5.6** below) to provide guidance to programmatic personnel in the packaging of Category 2 Hazardous Materials.

5.4 Materials Distribution Division

MDD and Category 3 Hazardous Materials

The Materials Distribution Division (MDD) has the responsibility and authority for:

- Providing transportation services to MMS for the transfer of Category 1 Hazardous Materials, if requested

- Providing transportation services to HWM Division for the transfer of Category 2 Hazardous Materials when requested
- Receiving and distributing Category 3 Hazardous Materials.

MDD's Onsite HMPT Safety Responsibilities

For onsite packaging and transfer of these hazardous materials, MDD is responsible for:

- Establishing a system of procedures and controls for the safe and efficient receipt and distribution of Category 3 Hazardous Materials onsite
- Assuring that Category 3 Hazardous Materials received from offsite meet DOT containment and communication requirements so that they can be transferred safely
- Approving onsite transfer policies developed and issued by LLNLfor Category 3 Hazardous Materials
- Providing transportation services to users of Category 3 Hazardous Materials
- Ensuring safe operation of the commercial motor vehicles under its control
- Issuing and implementing the MDD QA Plan for Hazardous Material Packaging and Transportation (See **Section 14.4**)
- Training MDD personnel.

5.5 Plant Engineering Department

Plant Engineering's HMPT Safety Responsibilities

The Plant Engineering Department has responsibility and authority for:

- Transferring onsite Category 3 Hazardous Materials required for normal Plant Engineering operations (materials of trade)
- Ensuring safe operation of the commercial motor vehicles under its control
- Providing assistance to other HMPT Safety organizations in moving large or heavy items that require special handling equipment.

5.6 Hazards Control Department

Hazards Control's HMPT Safety Responsibilities

The Hazards Control Department (Hazards Control) is responsible for developing and maintaining safety standards for onsite transfer of hazardous materials, substances, and wastes, and for providing guidance in their application.

Hazards Control is responsible for:

- Establishing safety procedures and controls for safe and efficient operations and research at the Laboratory, as per the *LLNL Health and Safety Manual*
- Monitoring packaging and transfer operations for compliance with occupational safety regulations
- Responding to emergency situations and incidents involving hazardous materials, substances, and wastes
- Providing liaison, safety guidance, and safety services to personnel involved with packaging and transfer operations
- Providing and coordinating Hazards Control's ES&H Teams
- Coordinating with the LLNL Fire Department
- Training LLNL and Hazards Control safety personnel
- Selecting, obtaining, calibrating, distributing, and maintaining all portable radiation detecting instruments.
- Monitoring radiation and other hazardous materials, substances, and wastes.
- Operating analytical laboratories
- Collecting and reporting safety data

Hazards Control also maintains programs for monitoring the work environment to assure the doses remain below applicable radiation-protection standards. These monitoring programs include monitoring and sampling for airborne radioactivity, surveying for surface contamination, and monitoring ambient radiation fields.

Role of Field Safety Teams

Hazards Control, through its Field Safety Teams, assists supervisors and employees in maintaining safe work areas and practices by providing information on the hazardous properties of materials, recommending methods for mitigating the hazards, and monitoring the work environment.

Composition of ES&H Teams

ES&H Teams in the Hazards Control Department directly interface with programmatic personnel, researchers, other users of hazardous materials, substances, and wastes, and waste generators. Four safety teams are each composed of a Safety Team Leader who coordinates the team's activities, Health and Safety Technicians, a Hazardous Waste Technician, and one or more discipline representatives from the following environmental and safety disciplines:

- Criticality Safety
- Explosives Safety
- Fire Protection Engineering
- Health Physics
- Industrial Hygiene and Toxicology
- Industrial Safety
- Environmental Protection.

5.7 Traffic Manager

Responsibilities for Hazardous Materials Shipments

Control of LLNL's offsite shipments of hazardous materials, substances, and wastes via LLNL, contract, and common carriers is the responsibility of the LLNL Traffic Manager. The Traffic Manager also interfaces with jurisdictional authorities and commercial carriers in the offsite shipment of hazardous materials, substances, and wastes.

The Traffic Manager has "go/no-go" authority for offsite shipments of hazardous materials, substances, and wastes, but has no direct operational responsibility for the onsite transportation of hazardous materials, substances, and wastes, but may provide regulatory guidance.

5.8 Environmental Protection Department

Compliance Role of EPD

In addition to HWM Division, EPD provides other support to LLNL. It ensures that the Laboratory can meet its environmental responsibilities as stipulated in environmental legislation, regulations, and DOE Orders, and collaborates with LLNL programs to maintain adequate protection for the environment.

Other EPD responsibilities related to the HMPT program include:

- Developing and maintaining LLNL environmental policies, plans, guidelines and practices
- Representing the Laboratory to the public and to federal, state, and local regulatory agencies on environmental issues
- Educating and training LLNL employees on environmental issues and responsibilities
- Informing management about pending changes in regulations impacting the Laboratory
- Guiding programs in complying with environmental laws and regulations
- Helping programs manage and minimize hazardous and radioactive waste
- Performing environmental monitoring of LLNL operations
- Determining the extent of environmental contamination from past activities
- Cleaning up environmental contamination to acceptable standards
- Responding to emergencies that impact the environment and providing guidance for cleanup, sampling, and reporting
- Auditing programs and facilities for compliance with LLNL, federal, state, and local environmental policies and regulations.

EPD's Environmental Analysts

EPD provides Environmental Analysts to the Hazards Control's ES&H Teams (see **Section 5.6**) and may provide guidance to programmatic personnel in the packaging of Category 2 Hazardous Materials and in compliance with environmental regulations.

As members of the Safety Teams, Environmental Analysts respond to emergency situations and incidents involving hazardous materials, substances, and wastes.

For More Information

LLNL's environmental protection program is described in greater detail in the *Environmental Protection Handbook* and supporting procedures.

5.9 Other Organizations Supporting HMPT Safety Activities

LLNL Assurance Office

If requested, the LLNL Assurance Office may provide guidance to the HMPT Safety Committee on management of QA appraisals and corrective action. If requested, the Assurance Office may also provides guidance to MMS, MDD, HWM Division, and MDD on preparation and maintenance of individual quality assurance and quality control programs. (Refer to "Hazardous Material Packaging and Transportation QA Program" section.)

Riggers from the Plant Engineering Department

The transfer of hazardous materials, substances, and wastes often requires transportation within heavy shielding and/or shipping containers. Also, the removal of large waste items, such as discarded tanks, require special moving equipment. The riggers from the Plant Engineering Department use cranes, hoists, or forklifts to move heavy items when requested by, and under the guidance of, the MMS or the HWM Division. The guidelines for use of these lifting devices are contained in the *LLNL Health and Safety Manual*.

Container Design, Modification, or Repair Services from Plant Engineering

MMS, MDD, or HWM Division, in an emergency, may request Plant Engineering to assist in the design, modification, or repair of containers for non-routine hazardous material transfers. The requesting organization must approve these containers prior to their use.

Protective Force Division

In addition to enforcing traffic policies onsite, the Protective Force Division within Safeguards and Security provides escorts for onsite transfers of DOE Safeguards Category I and II quantity materials.

Business Services Department's Fleet Management

The Fleet Management Group provides routine maintenance on all transportation vehicles. The Fleet Management Group also inspects and approves new explosives transportation vehicles prior to placing the vehicle in service and inspects incoming commercial vehicles delivering explosives to Site 300.

5.10 Users and Generators of Hazardous Material, Substances, and Waste

Responsibilities of Users and Generators of Hazardous Materials

Programmatic personnel, researchers, and other users of hazardous materials and substances, and hazardous wastes; and waste generators are responsible for:

- Notifying MMS concerning transfers of Category 1 Hazardous Materials (except explosives at Site 300) and providing MMS with the required information and documentation. MMS either packages the material, supplies the container, or advises the user as to correct packaging methods
- Providing personnel qualified to handle explosives, as per the *LLNL Health and Safety Manual*, Supplement 24.03
- Packaging and transporting explosives in explosives-qualified vehicles, according to the provisions of the *Site 300 Safety and Operational Manual* and this *HMPT Safety Manual*.
- Packaging Category 2 Hazardous Materials in accordance with "The Preparation Guide for Generators of Hazardous Chemicals and Radioactive Waste at LLNL," from the *LLNL Environmental Protection Handbook* and HWM Division's waste acceptance criteria
- Packaging and transferring Category 3 Hazardous Materials that are required for research and normal operations in quantities above 1 gal (unless otherwise specified) in accordance with this manual and the *LLNL Health and Safety Manual*
- Packaging and transferring Category 3 Hazardous Materials required for research and normal operations in quantities of 1 gal or below (unless otherwise specified) in accordance with regulations of the Occupational Safety and Health Administration (OSHA) and good management practices.

6. Safety Methodology

6.1 LLNL Safety Policies

Policy: Safety

LLNL safety policies are stated in the *LLNL Health and Safety Manual*. The focus of LLNL's safety methodology is to take every reasonable precaution in the performance of work to protect the health and safety of employees, the public, and the environment.

Applicable DOE Orders, prescribed standards, and state and federal regulations in the area of health and safety and the environment are to be complied with.

Policy: HMPT Safety

Onsite packaging and transportation activities of hazardous materials, substances, and waste are to be performed in a manner which ensures health and safety of employees, the public, and the environment.

Employee's Responsibility for Safety

No LLNL employee is expected to perform a task that he or she considers unsafe, nor is any employee to knowingly commit an unsafe act. Employees are responsible for adhering to LLNL, facility, and operational policies and procedures.

Management's Responsibility for Safety

Management's safety responsibility is fulfilled by:

- Ensuring that all equipment, experiments, and operations meet the requirements as stated in the *LLNL Health and Safety Manual,* an approved FSP, or an OSP.
- Observing the work environment and establishing measures to control or eliminate risks associated with any experiment, operation, or equipment.
- Taking appropriate corrective action whenever an incident occurs that results, or could result, in a serious accident.
- Training employees according to the requirements of their job.

Achieving a Safe Work Environment

An optimum safe work environment can be achieved most effectively by early identification and understanding of safety issues; close interaction among managers, employees, and safety specialists; and adherence to the policy and guidance of the *LLNL Health and Safety Manual*.

Limiting Exposure to Hazardous Agents

With respect to hazardous agents, both radioactive and nonradioactive, this protection is provided by limiting exposures of people and contamination of property to levels that are As Low As Reasonably Achievable (ALARA).

Definition: ALARA

ALARA means that individual and collective radiation doses to employees and radiation doses on the premises and in the surrounding environment shall be the minimum that can be achieved, while giving consideration to program requirements and economic limitations. The ALARA objective is achieved by integrating management involvement, education, and training, facility design, safety procedures, dosimetry, workplace monitoring, emergency preparedness, program evaluation, and benefit versus risk analysis.

For More Information

Safety criteria for performing tasks at the Main Site and Site 300 are included in the *LLNL Health and Safety Manual* and the *Site 300 Safety and Operational Manual.*

6.2 Containment, Communication, and Controls

Specifically, health, safety, and environmental protection is effected by:

- Providing ***adequate containment*** of hazardous materials, substances, and wastes during each transfer to ensure retention of materials under normal onsite transport operations
- Providing ***adequate communication*** to personnel who handle the material and to emergency responders so that the hazards of the material can be assessed
- Adhering to ***controls,*** including documented procedures and other administrative and/or physical control requirements, that:

– Are appropriate for the level of containment and communication provided and

– Take into account the possibility and consequences of credible accidents.

Definition: Containment

For purposes of this manual, ***containment*** is defined as the features of the package that prevent the release of the material in an uncontrolled manner to the environment during normal, onsite transport operations.

Definition: Communication

Communication is defined as any labeling, marking, placarding, or written material used to convey information about the hazard and the contents of the package to package handlers, transport personnel, and emergency responders. Communication can be:

- Affixed to a package or container involved in the onsite transport of hazardous material
- In possession of the responsible individual
- Electronically transmitted
- In or on the transport vehicle or in possession of the individual transporting the material.

Definition: Controls

Controls are defined as the administrative and/or physical controls that are applied to the transfer of hazardous materials, substances, and wastes, and which serve to mitigate risk during transport.

For More Information

Containment, ***communication***, and ***controls*** for Categories 1, 2, and 3 Hazardous Materials are summarized in **Sections 7, 8,** and **9**.

6.3 Chemical Safety and Health Hazards Communication

Material Safety Data Sheets

Federal chemical hazards communication laws require chemical manufacturers to provide Material Safety Data Sheets (MSDSs) which provide detailed information about on the physical, chemical, and physiological properties of a particular chemical and on recommended control procedures to be used during handling.

Users of chemicals are required to keep a file of MSDSs on hand near the point of use. Hazards Control Department also maintains a central database of MSDSs.

If an MSDS cannot be located, a supplemental MSDS is prepared by an LLNL Industrial Hygienist. When a material of unknown toxicity (MOUT) is developed at LLNL, an MSDS is also prepared.

For More Information

LLNL's chemical safety program is described in greater detail in the *LLNL Health and Safety Manual*, Chapter 8 (and supplements), "Hazardous Material Control," and Chapter 21 (and supplements), "Chemicals."

6.4 Guidelines for Traffic Management Safety

Compliance with Traffic Laws

Persons who operate vehicles (U.S. government, LLNL, rented, or private) onsite on official business are required to comply with all traffic laws of the State of California as defined by the California Vehicle Code. Drivers who are cited for traffic violations while engaged in official business are held responsible for the citations and may be subject to disciplinary action by LLNL as well.

Current Driver's License

Drivers of vehicles under the control of LLNL must have a current driver's license from their resident state for the class of motor vehicle being operated.

Speed Limits

On Main Site, the maximum onsite speed limit is 40 km/h (25 mph) unless otherwise posted. At Site 300, the maximum onsite speed limit is 56 km/h (35 mph) unless otherwise posted.

Internal Traffic Citations

LLNL issues internal citations to employees cited for traffic violations onsite and may evoke an employee's onsite driving privileges. Employees who are cited for moving violations will be disciplined according to the procedure described in the *LLNL Health and Safety Manual,* Chapter 35.07.

For More Information

Refer to the *LLNL Health and Safety Manual*, Chapter 35, "Traffic," for more detail on LLNL policy regarding traffic control and safety.

6.5 Guidelines for Radiation Safety

Policy: Onsite Transfers of Radioactive Materials

LLNL operations must be planned to prevent exposure of personnel to ionizing radiation in excess of the limits stated in DOE Order 5480.11.

Onsite transfers involving radioactive materials shall be conducted such that radioactive exposures are ALARA.

For More Information

LLNL's detailed ALARA program is given in the *LLNL Health and Safety Manual,* Supplement 33.011, "Guide to Reducing Radiation Exposures to AS LOW AS REASONABLY ACHIEVABLE (ALARA)." LLNL's radiation safety program is described in greater detail in that manual's Chapter 33, "Ionizing Radiation," and supplements.

6.6 Guidelines for Explosives Safety

Policy: Explosives Handling

Because of the serious consequences that can occur if explosives are handled improperly, LLNL's policy on handling explosives is that no operation involving explosives may be performed unless it is authorized by either an OSP or an FSP.

For More Information

The primary DOE-prescribed standard for explosives operations and facilities is the *DOE Explosives Safety Manual*.

6.7 Guidelines for Chemical Safety

Management's Responsibility for Safe Chemical Handling

Supervisors are responsible for establishing safe procedures and providing the necessary protective equipment for personnel who handle chemicals.

Chemical User's Responsibility

The chemical user must evaluate each task in which chemicals are used before beginning the activity. This evaluation must include a consideration of the properties and reactivity of the chemicals or combination of chemicals.

6.8 Safety of Visitors and Non-LLNL Personnel

Responsibilities of LLNL Hosts

LLNL employees who host visitors (students, participating guests, contract labor, vendors, etc.) must ensure that non-LLNL personnel receive initial training and continuing information regarding applicable safety policies. Non-LLNL personnel must follow LLNL regulations governing the safe and orderly conduct of operations.

Contractors and Safety

Contracts with outside vendors and subcontractors specify the necessary requirements and guidance needed to extend the Laboratory's safety policy to contractors who perform work at the Main Site and at Site 300.

Contractor personnel are responsible to their employer who is obligated by contract to comply with pertinent LLNL environmental, health, and safety standards. When contractor personnel fail to comply with these standards, LLNL may issue a stop work order.

LLNL provides fire-fighting and emergency ambulance services for all activities at LLNL.

6.9 Safety Audits and Inspections

Management Safety Reviews

Periodically, several levels of LLNL management review the Laboratory's safety procedures and broader aspects of Laboratory operations to ensure their continued effectiveness.

Assurance Office Reviews

The LLNL Assurance Office may conduct routine assessments of Laboratory operations. Assessment findings are forwarded to the appropriate line managers for review and action. Assessment records, resulting comments, and corrective actions are tracked by the Assurance Office. (See **Section 14** for more information on appraisals and corrective action.)

Hazards Control Reviews

All programs, facilities, and buildings are subject to reviews and evaluations by the Hazards Control Department. The results of these reviews are forwarded to the appropriate department so that deficiencies can be corrected. Records of these reviews, resulting comments, and corrective actions are maintained by Hazards Control and tracked by the LLNL Assurance Review Office.

Review of the Onsite HMPT Safety Manual

A periodic review of the *Onsite Hazardous Materials Packaging and Transportation Safety Manual* will be performed to ensure its continued effectiveness.

7. Category 1 Hazardous Materials

7.1 Introduction

LLNL has policies established to mitigate the risks from hazardous materials. This chapter provides LLNL's containment, communication, and control policies and their implementation requirements for onsite handling and transport of Category 1 Hazardous Materials. It identifies organizational responsibility and the hazards associated with Category 1 Hazardous Materials. **Section 8** provides those requirements for Category 2 Hazardous Materials, and **Section 9** for Category 3.

7.2 Accountability

Materials Management Section

MMS of the Applied Research Engineering Division is responsible for and authorized to control and account for Category 1 Hazardous Materials.

7.3 Identification of Category 1 Hazardous Materials

Types

Category 1 Hazardous Materials are both hazardous and "controlled" materials. The four types are:

- DOE's Accountable Nuclear Materials, Categories I, II, III, and IV
- Explosives
- Class II, III, and IV Sealed Sources and other radioactive materials
- DOE–controlled materials within a DOT Hazard Class, such as:
  - Other controlled materials that are defined as hazardous materials (for example, some forms of beryllium and its compounds, and carcinogens)
  - Nonhazardous controlled materials (for example, valuable materials, classified parts and material, special reactor materials, and Mock High Explosive [Mock HE]). **Note:** Certain types of mock HE may be hazardous material.

Table 7-1 lists hazard class numbers, division numbers, class or division names, and those sections of the DOT regulations (49 CFR) which contain definitions for classifying hazardous materials, including forbidden materials.

Table 7-1. DOT Hazardous materials classes and index to hazard class definitions

Class	Division No. (if any)	Name of Class or Division	49 CFR reference for definitions
None	—	Forbidden materials	173.21
None	—	Forbidden explosives	173.54
1	1.1	Explosives (with a mass explosion hazard)	173.50
1	1.2	Explosives (with a projection hazard)	173.50
1	1.3	Explosives (with predominately a fire hazard)	173.50
1	1.4	Explosives (with no significant blast hazard)	173.50
1	1.5	Very insensitive explosives substances	173.50
1	1.6	Extremely insensitive explosive articles	173.50
2	2.1	Flammable gas	173.115
2	2.2	Non-flammable compressed gas	173.115
2	2.3	Poisonous gas	173.115
3	—	Flammable and combustible liquid	173.120
4	4.1	Flammable solid	173.124
4	4.2	Spontaneously combustible material	173.124
4	4.3	Dangerous when wet material	173.124
5	5.1	Oxidizer	173.127
5	5.2	Organic peroxide	173.128
6	6.1	Poisonous materials	173.132
6	6.2	Infectious substance (Etiologic agent)	173.134
7	—	Radioactive material	173.403
8	—	Corrosive material	173.136
9	—	Miscellaneous hazardous material	173.140
None	—	Other regulated material: ORM-D	173.144

Note: The hazard class of a hazardous material is indicated either by its class (or division) number, its class name, or by the letters “ORM-D.”

7.4 Receiving and Transfer Operations for Category 1 Hazardous Materials

Delivery Requirements of Category 1

When Category 1 Hazardous Materials are delivered to either the Main Site or Site 300, they must meet DOT regulatory requirements.

Onsite Delivery Points

Shipments of hazardous materials are ordinarily delivered directly to the MMS Vaults. On occasion, however, Category 1 Hazardous Materials that arrive through commercial channels (except explosives) may be delivered to the Main Site Receiving Group of the Business Services Department.

Receiving's Storage Responsibilities

When the Receiving Group takes delivery of Category 1 Hazardous Materials, the containers are to be stored as follows:

- Place small containers of controlled materials into a Receiving cage area
- Store large containers in a controlled area supervised by a lead Receiving employee.

All Category 1 Hazardous Materials are to be load listed by Purchase Order number or by other identifying means in LLNL's Procurement Accounting Receiving Information System (PARIS) upon arrival at LLNL.

Caution: MDD Receiving personnel are prohibited from repackaging damaged containers of Category 1 Hazardous Materials or removing container labels or markings.

Transferring Category 1 Materials to MMS

The Receiving Group must contact MMS to arrange the transfer of Category 1 Hazardous Materials (except explosives at Site 300) to MMS control points for distribution to the user.

Using Riggers to Transport Large Packages

For packages too large for transport in MMS vehicles, MMS contacts the Riggers Group in Plant Engineering for assistance. Riggers personnel transport containers in approved vehicles to MMS control points under MMS supervision.

Transferring Packages between Buildings

LLNL personnel who want to transfer Category 1 Hazardous Materials between buildings onsite (except explosives at Site 300) must contact MMS prior to final packaging. MMS either packages the material, supplies the container, or advises the user concerning correct packaging methods. MMS transports the material in its vehicles or authorizes the package to be handcarried according to the MMS Handcarry Procedure, # MM-VI-10.

7.5 Receiving and Transport of Explosives

Delivery of Explosives at Site 300

All explosives are delivered directly to MMS at Site 300 from offsite.

Handling Explosives

When handling explosives, MMS:

- Uses LLNL-approved tote boxes with Kimpack lining and dunnage to repackage explosives for transfer and storage.

  Or stores and transfers explosives in their original shipping containers.
- Returns empty, reusable shipping containers to the vendor.
- Affixes proper LLNL Explosives Identification Labels to the containers.

Transfers of Explosives at Site 300

Site 300 personnel who handle explosives have been qualified to handle explosives in accordance with the *LLNL Health and Safety Manual*, Supplement 24.05. They may transfer explosives at Site 300 between buildings without the assistance of MMS.

However, transfers must be made in explosives qualified vehicles in accordance with the *LLNL Health and Safety Manual*, Supplement 24.03, and this manual (see the "Vehicle Requirements" section).

LLNL Organizations Approved to Transfer Explosives

LLNL organizations approved for transferring explosives at Site 300 in approved vehicles and packages are:

- MDD
- MMS

- W-Division, Military Applications Directorate
- B-Division, Nuclear Design Directorate
- Materials Manufacturing Engineering Division (MMED), Engineering Directorate
- Chemistry and Materials Science Directorate
- HWM Division (waste only).

Refer to **Figure 4-1** in **Section 4** for the LLNL Organizational Chart.

Handling Explosive Wastes

Explosive wastes are not permitted at HWM Division facilities or on the HWM waste run. Explosive wastes generated at LLNL are packaged per DOT requirements and shipped to Site 300 for waste treatment and disposal. Explosive wastes generated at the Main Site may be shipped directly to an offsite commercial Treatment, Storage, Decontamination Facility (TSDF) for treatment and disposal. Explosive wastes generated at Site 300 are packaged in approved containers and transferred to an approved Waste Accumulation Area (WAA) for disposal at Site 300 or shipped offsite for disposal.

Disposal of Explosive Waste

The approved disposal method for explosive waste is burning. No material other than explosives and explosives contaminated combustible waste and fuel to support combustion may be burned.

7.6 Containment, Communication, and Control Policies and Implementation Requirements for Explosives

This section provides containment, communications, and control policies and implementation requirements for explosives. Explosives are considered Category 1 Hazardous Materials.

Hazards from Explosives

Explosives hazards include blast, fragments, and thermal effects.

Containment Policy for Explosives

At the Main Site explosives are packaged in DOT- or DOE-approved containers. DOT packaging requirements are followed.

At Site 300, explosives are packaged in DOT-, DOE-, or LLNL-approved containers.

Containment Requirements for Explosives at Site 300

At Site 300, explosives are:

- Packaged in approved tote boxes, DOT- or DOE-approved, or other LLNL-approved containers and packages
- Cushioned with Kimpack liners, wrappings, and dunnage to preclude movement of the material inside the container.

The lids of large- and medium-sized tote boxes must be fastened down with cable-ties.

Communication Policy for Explosives

At the Main Site, explosives are packaged, labeled, and marked in conformance with DOT requirements. At Site 300, explosives or packaged and labeled to comply with the *Site 300 Safety and Operations Manual*.

Communication Requirements for Explosives at Main Site

During transport of explosives at the Main Site, vehicles carrying explosives are placarded with the standard DOT placards, if required per DOT. The containers must:

- Use DOT marking and labeling requirements to communicate explosive hazards
- Be identified with LLNL Explosive ID Labels
- Be accompanied by a Controlled Material Identification (CMID) Tag
- Be marked or labeled according to the appropriate hazard.

Communication Requirements for Explosives at Site 300

At Site 300, vehicles transporting explosives are placarded with standard DOT placards, if required by DOT. The explosives containers must:

- Be identified with LLNL Explosives ID Labels
- Accompanied by a Part Movement Tag.

Controls Policy for Explosives

The use of trained and qualified personnel greatly reduces the probability of personnel error that could lead to an accident.

Controls at the Main Site for Explosives

The following administrative and/or physical controls are in effect at Main Site to mitigate the risk from explosives during transport:

- Only qualified explosives handlers are allowed to handle explosives.

- Explosives must be packaged by MMS, or be under the control of MMS or personnel qualified to handle explosives in accordance with the *LLNL Health and Safety Manual,* Supplement 24.05.
- All vehicles used to transport explosives must be inspected using the Vehicle Inspection Form in **Figure 13-1**.
- MMS supplies the container and verifies that the container is approved.
- MMS transports explosives in approved vehicles in accordance with the *LLNL Health and Safety Manual,* Supplement 24.05.
- Access to explosives are strictly controlled by procedures.
- Hazards Control Explosives Safety maintains a current list of qualified explosives handlers.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed the onsite speed limit of 40 km/h (25 mph).
- DOT compatibility requirements are strictly followed. Fissile materials and explosives cannot be transported in the same vehicle.
- Explosives cannot be transported during a lightning alert.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.

Control Requirements at Site 300 for Explosives

The following administrative and/or physical controls are in effect at Site 300 to mitigate the risk from explosives during transport:

- Only MMS and other explosives handlers who are qualified as per the *LLNL Health and Safety Manual,* Supplement 24.05, are permitted to package and transport explosives.
- Explosives can only be transported in approved vehicles in accordance with the *LLNL Health and Safety Manual,* Supplement 24.05.
- Access to explosives are strictly controlled by procedures.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed an onsite speed limit of 40 km/h (25 mph) at Site 300.
- DOT compatibility requirements are strictly followed.
- Drivers are trained to understand and use DOT compatibility charts when loading vehicles.

- Fissile materials and explosives cannot be transported in the same vehicle. **Note:** Fissile materials are not allowed at Site 300 unless specifically authorized.
- Explosives cannot be transported during a lightning alert.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

7.7 Containment, Communication, and Control Policies and Implementation Requirements for Accountable Nuclear Materials, Safeguards Categories I and II

This section provides containment, communication, and control policies and implementation requirements for Accountable Nuclear Materials, Safeguards Categories I and II. These Safeguards Categories are considered Category I Hazardous Materials.

Hazards from Safeguards Categories I and II

Some Accountable Nuclear Materials are radioactive and fissionable.

Accountable Nuclear Materials are given Safeguards classifications that range from large quantities of attractive material (Category I) to small quantities of low attractive materials ([other nuclear materials][Category IV]).

Containment Policy for Categories I and II

Radiological hazards are controlled through the use of proper shielding and containment to limit personnel exposures to ALARA levels.

Containment Requirements for Categories I and II

Accountable Nuclear Materials, Safeguards Categories I and II, are packaged in Nuclear Regulatory Commission- (NRC-) or DOE-approved Type B containers or other MMS-approved containers. DOT, NRC, and DOE-approved containers are criticality approved for specific quantities of fissile materials.

Packaging requirements for certified containers are delineated in the container Certificate of Compliance, and/or Safety Analysis Report on Packaging (SARP), or materials are packaged to provide adequate safety, limit radiation exposure, control contamination, and limit the movement of the material inside the package.

Devices transferred onsite may also undergo an in-depth criticality analysis as part of their initial design.

Communication Policy for Categories I and II

Accountable Nuclear Materials are packaged to provide adequate safety and labeled or marked in a manner to properly communicate the identified hazard.

Communication Requirements for Categories I and II

During onsite transport of containers of Accountable Nuclear Materials, Safeguards Categories I and II; the containers must be accompanied by a:

- CMID
- Transfer Form for Accountable Material.

The Certificate of Compliance, and/or SARP for each container may also describe criticality control measures.

Controls Policy for Categories I and II

The use of trained and qualified material handlers and MMS personnel greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Categories I and II

The following administrative and/or physical controls are in effect to mitigate the risk from Accountable Nuclear Materials, Safeguards Categories I and II, during transport:

- Accountable Nuclear Materials must be packaged by or be under the control of MMS.
- MMS either supplies the container or verifies that the container is appropriate.
- A Protective Force Division escort is required at all times during loading, unloading, and transfer operations.
- Fissile materials are not allowed at Site 300 unless specifically authorized.
- Two MMS personnel on the DOE Personnel Assurance Program are required to accompany the material at all times.
- MMS transports Accountable Nuclear Materials, Safeguards Categories I and II, in MMS-owned or MMS-approved vehicles.
- Access to Accountable Nuclear Materials, Safeguards Categories I and II, is strictly controlled by MMS material control procedures.

- No handcarrying is authorized.
- DOT compatibility requirements are followed. Fissile materials and explosives cannot be transported in the same vehicle.
- Packages shall not be lifted or transported higher than 4 ft above the ground unless specifically authorized.
- Drivers must not exceed an onsite speed limit of 28 km/h (15 mph).
- The Main Site Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

7.8 Containment, Communication, and Control Policies and Implementation Requirements for Accountable Nuclear Materials, Safeguards Categories III and IV, and Other Non-sealed Source Radioactive Materials

This section provides the containment, communication, and control policies and implementation requirements for Accountable Nuclear Materials, Categories III and IV, and other non-sealed source radioactive materials.

Hazards from Safeguards Categories III and IV

Some Accountable Nuclear Materials are radioactive and fissionable.

Containment Policy for Categories III and IV

Radiological hazards are controlled through the use of proper shielding and containment to limit personnel exposures to levels that are ALARA.

Containment Requirements for Categories III and IV

Accountable Nuclear Materials, Safeguards Categories III and IV, and other non-sealed source radioactive materials are packaged in Nuclear Regulatory Commission- (NRC) or DOE-approved containers or other MMS-approved containers. DOT, NRC, and DOE-approved containers are criticality approved for specific quantities of fissile materials.

Packaging requirements for certified containers are delineated in the container Certificate of Compliance, and/or SARP; or materials are

packaged to provide adequate safety, limit radiation exposure, control contamination, and limit the movement of the material inside the package.

Devices transferred onsite may also undergo an in-depth criticality analysis as part of their initial design.

Communication Policy for Categories III and IV

Accountable Nuclear Materials are packaged to provide adequate safety and labeled or marked in a manner to properly communicate the identified hazard.

Communication Requirements for Categories III and IV

During onsite transport of containers of Accountable Nuclear Materials, Categories III and IV, the containers must be accompanied by:

- CMID Tag
- Transfer Form.

The Certificate of Compliance, and/or SARP for each container may also describe criticality control measures.

Controls Policy for Categories III and IV

The use of trained and qualified material handlers and MMS personnel greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Categories III and IV

The following administrative and/or physical controls are in effect to mitigate the risk from Accountable Nuclear Materials, Safeguards Categories III and IV, and other non-sealed source radioactive materials during transport:

- Materials must be packaged by or be under the control of MMS.
- MMS either supplies the container or verifies that the container is appropriate.
- MMS transports Accountable Nuclear Materials, Categories III and IV, in MMS-owned or MMS-approved vehicles. Note: Handcarrying a package is allowed on a one-time basis for some Category IV materials (e.g., depleted uranium).
- Access to materials is strictly controlled by MMS material control procedures.
- Fissile materials and explosives cannot be transported in the same vehicle.

- Fissile materials are not allowed at Site 300 unless specifically authorized.
- No more than 399 g of plutonium are packaged within a single container.
- Packages shall not be lifted or transported higher than 4 ft above the ground unless specially authorized by MMS.
- Drivers must not exceed the onsite speed limit of 40 km/h (25 mph) at the Main Site and 56 km/h (35 mph) at Site 300.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

7.9 Containment, Communication, and Control Policies and Implementation Requirements for Sealed Sources

Hazards from Sealed Sources

Sealed Sources have hazards classifications that range from Class I (low hazard) to Class IV (high hazard). Q(A) values for each radionuclide are given in Table 2 of the *LLNL Health and Safety Manual,* Supplement 33.45, and the MMS *Sealed Source Procedure Manual*.

Containment Policy for Sealed Sources

Radiological hazards of sealed sources are controlled through the use of proper shielding and containment to limit exposures to levels that are ALARA.

Containment Requirements for Sealed Sources

Sealed sources from offsite are received at the MMS Vault in DOT packages.

DOT packaging requirements for sealed sources are followed.

Sealed sources are transferred between buildings in DOT or DOE-approved packages whenever possible, or they are transferred in containers approved and handled only by MMS personnel trained and qualified to handle and transport sealed sources.

Communication Requirements for Sealed Sources

During onsite transport of sealed sources, the containers must:

- Be accompanied by a CMID Tag
- Have a yellow label and a plastic tag affixed (except for smoke detectors and exits signs).

Note: If the material is Class IV, the container must also have a metal tag attached indicating the source hazard class.

Controls Policy for Sealed Sources

The use of trained and qualified material handlers and MMS personnel greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Sealed Sources

The following administrative and/or physical controls are in effect to mitigate the risk from sealed sources during transport:

- Sealed sources must be packaged by or be under the control of MMS.
- MMS either supplies the container or verifies that the container is a DOT or DOE-approved, or other approved container packaged to provide adequate containment.
- Personnel who package and handle sealed sources during transfer operations are trained and qualified as per the *MMS Sealed Source Procedure Manual.*
- Access to sealed sources are controlled by MMS control procedures.
- Packages are swiped for non-fixed contamination prior to transport.
- MMS transports sealed sources in MMS-owned or MMS-approved vehicles.
- Handcarrying is allowed for sealed sources only with specific approval from MMS.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- DOT compatibility requirements are strictly followed. Materials Management Technicians are trained to understand and use DOT compatibility charts when loading vehicles.
- Drivers must not exceed the onsite speed limits of 40 km/h (25 mph) at the Main Site and 56 km/h (35 mph) at Site 300.
- Sealed sources are surveyed for radiation contamination semiannually.

- The Main Site Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

7.10 Containment, Communication, and Control Policies and Implementation Requirements for Other Category 1 Hazardous Materials

Hazards from Other Category 1 Hazardous Materials

Some Category 1 Hazardous Materials as identified in **Section 7.3** may require controls to ensure protection of LLNL personnel, the public, and the environment.

Containment Policy for Other Category 1 Materials

Controlled materials received from offsite are delivered in DOT packages by MMS.

Other Category 1 Hazardous Materials are packaged to provide adequate safety, limit exposure to hazardous materials, control contamination, and limit the movement of the material inside the package.

Containment Requirements for Other Category 1 Materials

These materials, when transferred between buildings, are transported in DOT or DOE-approved packages whenever possible, or the controlled materials are transferred in approved containers and handled by personnel under the supervision of MMS.

Communication Policy for Other Category 1 Materials

Hazardous and controlled materials are packaged, labeled, and marked in conformance with DOT requirements.

Communication Requirements for Other Category 1 Materials

During onsite transport of other Category 1 Hazardous Materials the containers must:

- Be accompanied by a CMID Tag
- Be marked or labeled to identify the appropriate hazard.

Controls Policy for Other Category 1 Materials

The use of trained and qualified material handlers and MMS personnel greatly reduces the risks associated with other Category 1 Hazardous Materials.

Control Requirements for Other Category 1 Materials

The following administrative and/or physical controls are in effect to mitigate the risk from other Category 1 Hazards Materials during onsite transport:

- Category 1 Hazardous Materials must be packaged by or under the control of MMS.
- MMS either supplies the container or verifies that the container is a DOT-approved or DOE-approved, or is a container packaged to provide adequate containment.
- Personnel packaging and handling Category 1 Hazardous Materials must comply with the *LLNL Health and Safety Manual* requirements for hazardous materials.
- If an operation is not covered under the existing MMS procedures, an OSP or an FSP must be prepared to address hazards, basic controls, and safety ground rules to be followed.
- Access to Category 1 Hazardous Materials are strictly controlled by MMS control procedures.
- MMS transports Category 1 Hazardous Materials in MMS-owned or MMS-approved vehicles.
- Handcarry authority may be authorized only in accordance with the *MMS Material Control and Accountability Manual*.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- DOT compatibility requirements are strictly followed. Drivers who are DOT HazMat employees are trained to understand and use DOT compatibility charts when loading vehicles.
- Drivers must not exceed the onsite speed limits of 40 km/h (25 mph) at the Main Site and 56 km/h (35 mph) at Site 300.
- The Main Site Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

8. Category 2 Hazardous Materials

8.1 Introduction

LLNL has established policies to mitigate the risks from hazardous materials. This Section provides LLNL's containment, communication, and control policies and implementation requirements for onsite handling and transport of Category 2 Hazardous Materials. At LLNL most Category 2 Hazardous Materials consist of hazardous, radioactive, or mixed waste. See **Section 8.4** for a description of Category 2 Hazardous Materials.

This Section identifies organizational responsibility and the hazards associated with the primary types of Category 2 Hazardous Materials at LLNL. **Section 7** provides those requirements for Category 1 Hazardous Materials, and **Section 9** provides them for Category 3 Hazardous Materials

8.2 Accountability

Hazardous Waste Management Division

The Hazardous Waste Management (HWM) Division has the responsibility and authority for providing guidance to waste generators on packaging Category 2 Hazardous Materials, and for transferring wastes generated at HWM Division facilities.

HWM Division treats, packages, and prepares for shipment hazardous, transuranic (TRU), low-level (LLW) radioactive, and mixed wastes.

Category 2 Hazardous Materials that are transferred to HWM Division or transferred between HWM Division facilities may be liquid or solid. Gas cylinders containing residual hazardous materials identified as hazardous waste are also handled by HWM Division. Explosive wastes may be shipped directly to an offsite commercial TSDF.

Explosives as an Exception

Explosives and explosives wastes are not handled routinely by HWM Division. Explosives wastes are considered Category 1 Hazardous Materials and are to be managed according to the policies and controls specified in **Section 7.5** of this document. HWM Division prepares shipping manifests for explosive waste shipments offsite.

8. 3 HWM Division Facilities

Description of HWM's Main Site Facilities

There are four active HWM Division facilities at the Main Site (a fifth facility, Building 419 Facility, is inactive and currently used for office space and/or non-waste storage):

- Building 233
- Area 514 Facility
- Area 612 Facility
- Building 693 Facility.

The Area 514 Facility and the Area 612 Facility include a total of 30 waste management units where hazardous, radioactive, and mixed waste is stored and treated. Area 514 contains processing equipment and storage areas for radioactive liquids. Area 612 has solid radioactive waste processing equipment and storage for radioactive wastes. Radioactive, hazardous, and mixed wastes are also treated and/or stored at Building 233. Building 625 is the primary storage location for TRU mixed waste. Hazardous wastes are also processed in the Building 693.

HWM's Waste Handling Operations

The following waste handling operations are performed at HWM Division facilities:

- LLNL Building 513—Shredder/Solidification/Waste Storage
- LLNL Building 514—Liquid Waste Treatment
- LLNL Building 612—Receiving/Segregation/Drum Storage/Container Crushing
- LLNL Building 614—Eight-Cell Storage for Hazardous Wastes
- LLNL Building 625—PCB, TRU, Asbestos Waste Storage
- LLNL Building 693—Chemical Waste Storage.

Description of HWM's Site 300 Facility

HWM Division also has a Site 300 facility, a covered container storage area adjacent to Building 883. This Treatment, Storage, and Distribution Facility (TSDF) facility is primarily used to hold hazardous waste before it is transferred to Main Site.

8.4 Identification and Hazards of Category 2 Hazardous Materials

This section below provides more information on the hazards associated with various types of Category 2 Hazardous Materials.

Types of Category 2 Hazardous Materials

Category 2 Hazardous Materials can be hazardous, radioactive, or mixed (radioactive and hazardous). Category 2 Hazardous Materials include solid and liquid hazardous, radioactive, and mixed wastes; pressurized gases; hazardous waste samples; and sludge and liquid from wastewater retention tanks. **Table 8-1** identifies LLNL waste streams that require routine chemical and radiological analyses to monitor specific contaminants, components, and characteristics of Category 2 Hazardous Materials.

Table 8-1. Waste streams containing Category 2 Hazardous Materials

Waste Stream	Category 2 Hazardous Material
Acids and Bases	pH, normality
Plating or Heavy Metal Solutions	Metal concentrations; Cyanides, where cyanides are being used
Non-chlorinated or Mixed Organic Solvents	Flash point; Volatile Halocarbon Solvents
Oils	Volatile Halocarbon Solvents; PCBs; Percent Oil or Water; Flash point (if volatile components)
Coolants	Volatile Halocarbon Solvents; Percent Oil; Metal contaminants
Radioactive Materials	Curies or grams of radioactive material
Solid Wastes and Sludges	Extraction test for metals

Hazardous Solid and Liquid Wastes

Hazardous wastes are those listed by:

- EPA
- California Department of Toxic Substances Control (DTSC).

Hazardous liquid and solid wastes are nonradioactive, but may be characterized as carcinogenic, toxic, poisonous, corrosive, reactive, flammable, or ignitable.

Solid and Liquid Low-Level Radioactive Wastes

The types of radionuclides handled at LLNL are numerous and the associated activity varies.

Radioactive wastes are those waste materials with that contain radioactivity, as defined by the LLNL document, *Criteria and Procedures for the Certification of Non-Radioactive Hazardous Wastes*.

Transuranic Wastes

The radionuclides present in TRU waste vary; however, by volume, 95% is contaminated primarily by plutonium isotopes. The remaining 5%, by volume, is contaminated by (but not limited to) Am-241, Np-237, Cm-244, Cm-248, Cf-250, Cf-252, and fission products.

Mixed Wastes

Mixed wastes are wastes that are both radioactive and contaminated with nonradioactive hazardous wastes. Mixed wastes can be liquid or solid. They may also be carcinogenic, toxic, corrosive, reactive, pyrophoric, or ignitable; and they may be held in pressurized containers.

Pressurized Gas Cylinders

Pressurized gases can be flammable, toxic, corrosive, reactive, or cryogenic. A small spill can produce a large volume of gas which can displace air in a confined space.

Hazardous Waste Samples

Hazardous waste samples are taken by the waste generators at the waste generation sites. They are transferred to the onsite Environmental Analytical Sciences Laboratory for analysis. Hazardous waste samples are typically corrosive liquids, aqueous/organic liquids, contaminated oils, polychlorinated biphenyl- (PCB-) contaminated oils, aqueous liquids contaminated with metals and/or organics, coolants, solids, sludges, and unknown substances. They may be either radioactive or nonradioactive.

Samples are considered low hazard because of the small quantity of material present and adherence to strict chain-of-custody procedures. See

Section 8.10 for the policies and implementation requirements concerning hazardous waste samples.

Liquid Waste Retention Tank

Above-ground retention tanks are used throughout the Main Site and Site 300 to collect large volumes of wastewater. This wastewater may contain constituents that exceed sanitary sewer discharge limits. Retention tank wastewaters are analyzed to determine whether they can be discharged to the sanitary sewer, either directly or after pH adjustment, or whether they must be disposed of as hazardous waste.

8.5 Waste Generator's Responsibilities in Packaging and Transferring Category 2 Hazardous Materials

This section describes the responsibilities of the waste generator to package and palletize hazardous waste for onsite transfer to an HWM facility.

The Generator's Responsibilities

Waste generators are programmatic personnel, researchers, and other users who generate hazardous waste as a byproduct of their activities. They are responsible for packaging their Category 2 Hazardous Materials, taking samples, having the samples analyzed, placing the containers on pallets, and transferring the pallets to a WAA. Their responsibilities in these tasks is described below.

Packaging Hazardous Waste for Transfer

Waste generators are responsible for packaging Category 2 Hazardous Materials for onsite transfer to HWM Division facilities. The waste generator must:

- Plan ahead for waste disposal by considering other options, such as recycling, re-use, waste minimization, on-line treatment, and material substitution
- Determine the waste type, i.e., hazardous, radioactive, or mixed
- Segregate the wastes as they are generated to prevent mixing incompatible materials or wastes that are difficult to dispose of
- Package wastes in containers approved for transfer by HWM Division
- Provide proper identification of the waste package contents

- Separate incompatible waste packages from each other and separate radioactive waste packages from nonradioactive waste packages in the process areas
- Obtain samples of the hazardous waste and have them analyzed before the wastes are picked up by HWM Division
- Place waste packages on pallets and prepare waste packages for transfer according to waste generator and WAA guidelines.

Placing Waste Containers on Pallets

Packages of Category 2 Hazardous Materials must be delivered to the WAAs secured on pallets. Waste generators are required to:

- Place packages of chemically incompatible materials on separate pallets. Compatibility requirements are outlined in "The Preparation Guide for Generators of Hazardous Chemicals and Radioactive Waste at LLNL" in the *Environmental Protection Department Handbook*
- Separate pressurized materials from other hazardous wastes and overpack or individually secure them to a pallet
- Place waste containers of 209 L (55 gal) or smaller on pallets that can be loaded by forklift onto a flatbed truck. These pallets must be in serviceable condition with no breaks, loose boards, or lifting nails
- Limit the load per container. Drums shall not weigh more than 430 kg (750 lb). Other containers shall not exceed design limits
- Limit the load per pallet. No wooden pallet shall be loaded with more than two full drums of liquid, three full drums of solid waste, or four empty drums. No PDQ-manufactured plastic pallet shall be loaded with more than four drums or exceed 1,357 kg (3,000 lb)
- Distribute the load on each pallet. **Note:** Stacking should be avoided and is prohibited for 18-L (5-gal) cans and cardboard boxes more than two high.
- Load each pallet in such manner that waste labels are visible
- Strap or tape all containers together on the pallet
- Check to ensure that all containers on the pallets are approved for pickup by HWM Division
- Inspect all containers to ensure that:
  - None is leaking or unserviceable
  - All caps and bungs are sealed tightly
  - There is no waste spillage or contamination on the sides of the container

  - The containers show no evidence of swelling
  - Containers of liquid have adequate head space
  - Boxes are secured and undamaged
- Overpack damaged packages
- Ensure pallets are accessible to forklifts
- Deliver the palletized waste to the WAA located near the waste generating facility.

Waste Pickup and Onsite Transfers

WAAs are located at or near the waste generation site. Hazardous waste that has been properly segregated, identified, and packaged may be stored in a WAA for up to 90 days. Within that period of time, the waste is removed by HWM Division for storage, treatment, and/or disposal.

For More Information

Guidance on the responsibilities of the waste generator is found in:

- *Guidelines for Waste Accumulation Areas*
- *The Preparation Guide for Generators of Hazardous Chemicals and Radioactive Waste at LLNL" from the Environmental Protection Department Handbook*
- HWM Division's waste acceptance criteria (WAC).

Training requirements for waste generators are described in **Section 11**.

For more information and guidance on packaging of Category 2 Hazardous Materials, waste generators can contact Field Hazardous Waste Technicians from HWM Division, and Environmental Analysts from the Operations and Regulatory Affairs Division (ORAD).

8.6 Transport of Category 2 Hazardous Materials

This section provides requirements for the transport of Category 2 Hazardous Materials at Site 300, Main Site, and between LLNL facilities.

Waste Transport and Schedule at Main Site

At the Main Site, hazardous wastes are transported from waste generating sites to waste management facilities by HWM Division personnel in HWM Division vehicles once per week on the hazardous waste run.

Transfers between HWM Division's Main Site Facilities

Category 2 Hazardous Materials received at Area 612 can be transferred by HWM Division in HWM Division vehicles to Area 514 for waste treatment.

Category 2 Hazardous Materials treated at Area 514 can be transferred by HWM Division in HWM Division vehicles to Area 612 for preparation for offsite shipment or to Buildings 612, 614, 625, and 693 for storage.

Waste Transport at Site 300

At Site 300, hazardous wastes are transported from the waste generating sites to the Site 300 Treatment, Storage, and Distribution Facility (TSDF) by HWM Division personnel in HWM Division vehicles on a request basis.

Wastes located at a WAA within 500 feet of the TSDF are transported to the TSDF by HWM Division in forklifts.

Waste Transport from Site 300

Category 2 Hazardous Materials are shipped from the TSDF to HWM Division facilities at the Main Site or to other offsite licensed disposal facilities.

Caution: Category 2 Hazardous Materials shipped from Site 300 to the Main Site are shipped over public roads and, therefore, must meet DOT requirements.

8.7 Containment Policy and Implementation Requirements for Category 2 Hazardous Materials

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This section provides containment policy and implementation requirements for Category 2 Hazardous Materials.

Containment Policy for Category 2 Materials

Radiological hazards are controlled through the use of proper packaging and containment to limit personnel exposures to levels that are ALARA.

Containment Requirements for Category 2 Hazardous Materials

Containment requirements for Category 2 Hazardous Materials at LLNL Main Site are delineated in *The Preparation Guide for Generators of Hazardous Chemicals and Radioactive Waste at LLNL* in the *LLNL Health and Safety Manual*. Containment requirements for Site 300 are delineated in the *Site 300 Safety and Operational Manual,* Procedures # 404 and 406 404 and 406 404 and 406. HWM Division's waste acceptance criteria also provides containment requirements for Category 2 Hazardous Materials

Containment Requirements for Radioactive Materials

Radioactive materials are packaged onsite in DOT, NRC, DOE, or LLNL-approved containers with following restrictions:

- To protect from an accidental nuclear criticality, the combination of fissile materials at an HWM Division facility shall not exceed 120 g in each 55-gal drum
- For fissile materials stored in containers other than 55-gal drums, any combination of 233U, 235U, and 239U at an HWM facility (Area 612 Facility) must not exceed 120 g aggregate total.

Containment Requirements for Pressure Vessels and Cylinders

Pressure vessels and cylinders are managed under the Hazards Control pressure safety program as described in the *LLNL Health and Safety Manual*, Chapter 32. Waste gases are transported in cylinders adequately tied down to the transport vehicle.

Transport of Liquid Waste

Nonsewerable wastes are pumped from the retention tanks to portable containers and placed in the WAAs. Large volumes of wastes are pumped into tanks. HWM flatbed trucks transfer the tanks directly to HWM Division facilities for treatment or shipment preparation, or the wastes are shipped directly offsite.

8.8 Communication Policy and Implementation Requirements for Category 2 Hazardous Materials

This section provides the communications policy and requirements for Category 2 Hazardous Materials, including required placards on transport vehicles and container labels.

Communication Policy for Category 2 Materials

Category 2 Hazardous Materials must be packaged, labeled, and marked in conformance with DOT requirements.

Communication Requirements for Category 2 Materials

Waste disposal requisitions are reviewed for adequacy by HWM Division prior to waste pickup and transfer.

Waste run vehicles transporting hazardous wastes are placarded with DOT "Dangerous" placards.

Labeling Requirements for Category 2 Materials

Containers of Category 2 Hazardous Materials must also be clearly labeled as follows:

Low-Level Radioactive Waste (LLW) Labels: At the Main Site and at Site 300, LLW containers are identified with Radioactive Waste Labels. A Waste Disposal Requisition must accompany the transfer.

Transuranic (TRU) WasteLabels: At the Main Site and at Site 300, TRU containers are identified with Radioactive Waste Labels. A Waste Disposal Requisition must accompany the transfer.

Hazardous Waste Labels At Main Site and Site 300, Category 2 Hazardous Material containers are identified with Hazardous Waste Labels. An LLNL Hazardous Waste Disposal Requisition must also accompany the transfer. **Note:** If the waste contains a material listed in Appendix A-1 of the *LLNL Health and Safety Manual*, Supplement 21.16 ("Safe Handling of Carcinogenic Substances"), a "Danger—Chemical Carcinogen" label must also be affixed to the waste container.

Retention Tank Waste Labels: The Hazardous Waste Retention Tanks are labeled with the same label as hazardous waste containers.

Mixed Waste Labels: At the Main Site and at Site 300, mixed waste containers are identified with Mixed Waste Labels. An LLNL Waste Disposal Requisition or a TRU Waste Requisition must accompany transfers of mixed wastes. **Note:** If the waste contains a material listed in Appendix A-1 of the *LLNL Health and Safety Manual*, Supplement 21.16

("Safe Handling of Carcinogenic Substances"), a "Danger—Chemical Carcinogen" label must also be affixed to the waste container.

Pressurized Gas CylinderLabels: At the Main Site and at Site 300, Category 2 Hazardous Material containers are identified with Hazardous Waste Labels. An LLNL Hazardous Waste Disposal Requisition must also accompany the transfer. **Note:** If the waste contains a material listed in Appendix A-1 of the *LLNL Health and Safety Manual*, Supplement 21.16 ("Safe Handling of Carcinogenic Substances"), a "Danger—Chemical Carcinogen" label must also be affixed to the waste container.

8.9 Control Policy and Implementation Requirements for Category 2 Hazardous Materials

This section provides the control policy and requirements for Category 2 Hazardous Materials, including personnel authorized to handle and transport Category 2 Materials, transport conditions, limitations, and constraints.

Control Policy for Category 2 Materials

The use of trained and qualified material handlers and HWM Division personnel greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Category 2 Materials

The following administrative and/or physical controls are in effect to mitigate risk during onsite transport:

- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- LLNL employees who generate hazardous or radioactive waste must complete the required EPD training for these activities.
- Waste requisitions are reviewed by HWM Division prior to pick up on the waste run.
- An HWM Division technician accompanies the HWM Division driver on the waste run.
- The HWM Division technician inspects all packages prior to transport to HWM Division facilities.

- Wastes are segregated for chemical compatibility on the truck bed, according to OSP 530.
- Drivers must not exceed a 40-km/hr (25-mph) speed limit at LLNL and a 56-km/hr (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

8.10 Containment, Communication, and Control Policies and Implementation Requirements for Hazardous Waste Samples

This section provides containment, communication, and control policies and requirements for hazardous waste samples.

Containment Policy for Hazardous Waste Samples

Hazards associated with hazardous waste samples are controlled through the use of proper packaging and containment to limit personnel exposures to levels that are ALARA.

Containment Requirements for Hazardous Waste Samples

Hazardous waste samples are packaged as follows:

- Waste samples are collected in sample bottles appropriate for the sample type.
- The bottles are placed in either a plastic bottle carrier, an ice chest, or a plastic tray with foam spacers.
- Individual samples may be transported to the analytical laboratory in ziplock polyethylene bags.

Communication Policy for Hazardous Waste Samples

Hazardous waste samples are packaged, labeled, and marked in conformance with DOT requirements.

Communication Requirements for Hazardous Waste Samples

During onsite transfers of hazardous waste samples, the following requirements are in effect:

- The waste generator is required to submit a HWM Control Laboratory Analysis Request form and/or a Hazards Control Radioactivity Sampling Record Form (which contains sample identity data) to the analytical laboratory.
- Sample numbers which correspond to a sample log are written on each sample bottle, as well as the sample date and location.
- An Analytical Sample Custody Record form accompanies the transfer.

Control Policy for Hazardous Waste Samples

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Hazardous Waste Samples

Waste samples are controlled by a strict chain-of-custody procedure entitled HWM Division-402, Analytical Sample Custody Procedure.

9. Category 3 Hazardous Materials

9.1 Introduction

LLNL has established policies to mitigate the risks from hazardous materials. This Section provides LLNL's containment, communication, and control policies and implementation requirements for on-site handling and transport of Category 3 Hazardous Materials. It identifies organizational responsibility and the hazards associated with the primary types of Category 3 Hazardous Materials. **Section 7** provides those requirements for Category 1 Hazardous Materials, and **Section 8** provides them for Category 2 Hazardous Materials.

9.2 Accountability

Materials Distribution Division

The Materials Distribution Division (MDD) has responsibility and authority for receiving and distributing Category 3 Hazardous Materials and provides explosives and other transportation support for both Site 300 and Main Site. MDD may also, on occasion, provide transportation services to HWM Division for transfer of Category 2 Hazardous Materials and to MMS for transfer of Category 1 Hazardous Materials.

9.3 Identification and Hazards of Category 3 Hazards Materials

Types of Category 3 Hazardous Materials

Category 3 Hazardous Materials include pressurized gases, polychlorinated biphenyls (PCBs), mercury and its compounds, acids, bases, and other toxic substances. Category 3 Hazardous Materials can fall into any DOT Hazard Class except radioactive materials or explosives. (See **Table 7-1** for DOT Hazard Classes references to 49 CFR.) The paragraphs below present more information on the hazards associated with various Category 3 Hazardous Materials.

Pressurized Gases

Pressurized gases can be flammable, toxic, corrosive, reactive, or cryogenic. A small spill can produce a large volume of gas which can displace air in a confined space.

Pressure vessels and cylinders are managed under the Hazards Control pressure safety program as described in the *LLNL Health and Safety Manual,* Chapter 32. Pressurized materials are transported in DOT containers adequately tied down to the transport vehicle.

LLNL uses its ChemTrack system to track vendor-owned cylinders on-site at the Laboratory. The Industrial Gases Group of MDD affixes barcodes to incoming cylinders and documents their initial delivery points at the Main Site and Site 300.

Polychlorinated Biphenyls (PCBs)

Contact with PCBs can cause skin irritation and/or acne-like cysts. Eye contact causes severe eye irritation. Smoke and mist from burning PCBs can cause respiratory irritation. PCBs are extremely persistent in the environment and tend to accumulate in food chains.

EPD tracks the location of PCBs on-site. PCBs are managed according to *LLNL Health and Safety Manual,* Supplement 21.17, "Safe Handling, Storage, and Disposal of Polychlorinated Biphenyls (PCBs)"

Mercury and Its Compounds

Metallic mercury vapor is readily absorbed from inhaled air and can also pass through intact skin. Chronic exposure will effect the nervous system. Some mercury salts can irritate the skin and cause kidney damage. Other mercury compounds can be explosive or oxidizers.

Mercury and compounds are managed according to *LLNL Health and Safety Manual,* Supplement 21.11, "Safe Handling of Mercury."

Acids and Bases

Acids and bases are corrosive and can cause burns on contact with the skin. Vapors, mists, and dusts, when inhaled, may cause irritation of the respiratory system and may be absorbed into the blood stream through the lungs. When mixed with other chemicals, severe reactions can occur.

Acids and bases are managed according to *LLNL Health and Safety Manual,* Supplement 221.15, "Safe Handling of Acids and Bases."

Other Toxic and Hazardous Materials

Other Category 3 Hazardous Materials may be classed as pyrophoric liquids, flammable solids, oxidizers, organic peroxides, poisons, irritating materials, or etiological agents and may have toxic properties. Toxic and hazardous materials are managed according to *LLNL Health and Safety*

Manual, Chapter 8, "Hazardous Material Control," and Chapter 11, "Chemicals."

9.4 Transport of Category 3 Hazardous Materials

Receiving and Transfer of Pressurized Gases

Pressurized gas cylinders arriving at either Main Site or at Site 300 are required to meet DOT requirements. Cylinders are delivered to the LLNL Industrial Gas area of MDD.

MDD transports gas cylinders to the user in the original DOT packages in MDD vehicles.

No repackaging or removal of labeling or markings is permitted.

Toxic gases are delivered within one day directly to the user who signs for release of the cylinder.

User Pickup of Gas Cylinders

As an alternative, the user may also pick up and transport Category 3 Hazardous Materials from the Industrial Gas area in a pickup truck. Cylinders must be adequately tied down before Industrial Gas personnel will allow users to transport the cylinders.

Empty Gas Cylinders

MDD picks up empty gas cylinders and transports them to the Industrial Gas Area for return to the vendor; or if the cylinder is LLNL-owned, MDD returns it to a vendor for to be refilled.

Cargo Tanks

Cargo tanks are used to transport gasoline, diesel fuel, and other hazardous liquids at the Main Site and at Site 300. Tank vessels are required to conform to DOT requirements on-site. Because no additional containment, communication, or controls are required, hazardous materials transported in tank vessels are not discussed below.

Receiving and Transport of Chemical, Alcohol, Oils, and Solvent Drums

Five-gal drums and 55-gal drums of chemicals, alcohol, oils, and solvents are delivered to the LLNL Industrial Gas area of MDD. Drums arriving at LLNL or at Site 300 are required to meet DOT requirements.

MDD transports these drums to the user in the original DOT packages in MDD vehicles. No repackaging or removal of labeling or markings is permitted. Damaged containers are repackaged in DOT-specification containers or other approved containers.

User Pickup of Drum Containers

The user may also pick up and transport drums of Category 3 Hazardous Materials from the Industrial Gas area in a pickup truck. Containers must be adequately secured before Industrial Gas personnel will allow users to transport Category 3 Hazardous Materials.

Receiving and Transfer of Packaged Chemicals

Category 3 Hazardous Material packages arriving at Main Site or at Site 300 are required to meet DOT requirements. Packages are delivered to the LLNL Receiving Group of MDD and are then load listed in the LLNL PARIS computer system.

MDD transports Category 3 Hazardous Materials to the user in the original DOT packages in MDD vehicles. No repackaging or removal of labeling or markings is permitted. Damaged containers are repackaged by MDD in DOT-Specification containers or other approved containers.

User Pickup of Packaged Materials

The user may pick up and transport Category 3 Hazardous Materials from the receiving area in a pickup truck. MDD insures that packages are adequately tied down.

Break-Bulk Transfers between LLNL Facilities

Category 3 Hazardous Materials in quantities greater than 1 gal are packaged and transferred between LLNL facilities in accordance with the controls in this plan, as provided in the *LLNL Health and Safety Manual,* and incorporated into individual Facility Safety Procedures (FSPs) and Operational Safety Procedures (OSPs) as written or revised. OSPs are reviewed every year and FSPs are reviewed every three years.

Research Quantities

Research quantities (quantities less than 1 gal) of Category 3 Hazardous Materials, unless otherwise specified, are handled, packaged, and transported in accordance with OSHA requirements and good management practices. Proper containment, communication, and controls must be provided to ensure safety during normal transport.

9.5 Containment, Communication, and Control Policies and Requirements for Pressurized Gases

Containment Policy for Pressurized Gases

Category 3 Hazardous Materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Pressurized Gases

Pressurized gases are contained and transferred in DOT-specification cylinders or vessels. Nonconforming containers are not permitted on-site. Damaged or modified containers are disposed of as hazardous waste or sold as salvageable material.

Communication Policy for Pressurized Gases

Gas cylinders and vessels must be marked or labeled according to the appropriate hazard and in accordance with DOT regulations.

Communication Requirements for Pressurized Gases

DOT markings and labels are required on pressurized gas cylinders and vessels.

- Vendor-owned gas cylinders are barcoded and tracked internally by LLNL's ChemTrack system.
- Vehicles (except user vehicles) carrying compressed gas cylinders are placarded as per DOT requirements.
- Commonly used gas cylinders are color-coded for easy identification. **Table 9-1** lists the color codes for gas cylinders used at Main Site and Site 300.

Control Policy for Pressurized Gases

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Table 9-1. Color codes for gas cylinders[a].

Type of Gas	Cylinder Owner	Color Code
Acetylene	LLNL	Red
Compressed air	LLNL	Gray
Argon	LLNL	Brown
Carbon dioxide	Vendor	Silver
Carbon dioxide siphon	Vendor	Blue with yellow neck ring[b]
Helium	Vendor or LLNL	Gray with cream top
Hydrogen	LLNL	Red
Methane	LLNL	Aluminum with blue top
Nitrogen	LLNL	Black
Oxygen	LLNL	Green

[a] LLNL owned cylinders are stenciled "Property of LLNL" on a 12-in.-wide *yellow* band at the cylinder base.

[b] Carbon dioxide siphon cylinders for fire protection systems are painted red.

Control Requirements for Pressurized Gases

Stock gas cylinders are normally transported by truck. Large quantities are sometimes delivered to the users on a flatbed trailer. Refer to **Table 9-2** for other vehicles used to transport compressed gases.

The following administrative and/or physical controls are in effect to mitigate risk during transport of pressurized gas cylinders or vessels:

- Gas cylinders must be secured to the side rails in an upright position.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- While transferring Category 3 Hazardous Materials, drivers must not exceed a 40-km/h (25-mph) speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300.
- The user may transport quantities of gas cylinders in a pickup truck, provided the cylinders are tied down.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

Table 9-2. MDD vehicles.

Vehicle type	On-Site Transport Use for Category 3 Hazardous Materials
Semis	Toxic gas cylinders, 55-gal drums, safety cans
Flatbed truck	Stock gas cylinders
Flatbed trailers	55-gal drums, DOT-specification packages, safety cans, stock gas cylinders, hazardous waste
Pickup	5-gal safety cans, gas cylinders
MDD RDS Vans	Hazardous materials in DOT-approved packaging

9.6 Containment, Communication, and Control Policies and Requirements for Flammable and Combustible Liquids

Containment Policy for Flammable and Combustible Liquids

Category 3 Hazardous Materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Flammable and Combustible Liquids

Flammable and combustible liquids can be transported in either DOT-specification 55-gal drums, DOT 5-gal drums, or LLNL-approved 5-gal safety cans or other DOT-approved containers.

Communication Policy for Flammable and Combustible Liquids

Packages are marked or labeled according to the appropriate hazard, and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Flammable and Combustible Liquids

Flammable and combustible liquids must be labeled during transport as follows:

- DOT-specification containers that are delivered to the user by Receiving or from Industrial Gases are labeled using DOT labels.
- DOT packages and/or safety cans are labeled, “For Flammable Liquids Only.”
- Ethyl alcohol must be labeled with an ethyl alcohol label.

- Vehicles (except user vehicles) carrying flammable and combustible liquids are placarded as per DOT requirements.

Control Policy for Flammable and Combustible Liquids

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Flammable and Combustible Liquids

Flammable and combustible liquids are delivered to the users on MDD vehicles.

The following administrative and/or physical controls are in effect to mitigate risk during transport:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal in safety cans, but the cans must be tied down to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at Main Site and a 56-km/h (35-mph) speed limit at Site 300 while transporting Category 2 Hazardous Materials.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

9.7 Containment, Communication, and Control Policies and Requirements for Polychlorinated Biphenyls (PCBs)

Containment Policy for PCBs

Category 3 Hazardous Materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for PCBs

- Leaking containers must be drained, then repackaged in a secondary container such as a drum.
- PCBs and PCB-containing equipment must be transported in sealed containers to prevent leakage to the environment.

Note: A capacitor or transformer which is not leaking is considered an acceptable container.

Communication Policy for PCBs

Packages are marked or labeled according to the appropriate hazard, and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for PCBs

Equipment containing PCBs are labeled with an LLNL PCB Label.

A CMID tag prepared by the Hazards Control technician assigned to the operational area must also be used whenever PCB-containing materials are transferred on-site.

Vehicles are placarded in accordance with DOT regulations.

Control Policy for PCBs

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for PCBs

The following administrative and/or physical controls are in effect to mitigate risk during on-site transport:

- The user may transport PCB materials in a pickup truck, provided the PCBs are not intended for waste, the containers are leak-tight, and they are adequately tied down.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

9.8 Containment, Communication, and Control Policies and Requirements for Mercury and Its Compounds

Containment Policy for Mercury and Its Compounds

Category 3 hazardous materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Mercury and Its Compounds

Mercury and its compounds must be transported in either DOT-specification containers or sealed, double-contained, impact-resistant containers, regardless of the amount.

The outer containers should be filled with packing, such as Kimpack or bubble pack. Sweeping compounds may be used as packing material if oil or other contaminants are also present.

Communication Policy for Mercury and Its Compounds

Packages are marked or labeled according to the appropriate hazard and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Mercury and Its Compounds

DOT-specification containers delivered to the user from Receiving are labeled using DOT labels.

Regardless of the amount, a "Mercury" label must be affixed to each container.

Vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Control Policy for Mercury and Its Compounds

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Mercury and Its Compounds

The following administrative and/or physical controls are in effect to mitigate risk during on-site transport:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal, but the containers must be tied down to a truck bed.

- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.
- MDD vehicles are used to deliver mercury and its compounds to the users.
- The user may handcarry or transport small quantities of mercury and its compounds in pickup trucks or in LLNL Kushman carts as long as proper containment and communication controls are adhered to.

9.9 Containment, Communication, and Control Policies and Requirements for Acids and Bases

Containment Policy for Acids and Bases

Category 3 hazardous materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Acids and Bases

Acids and bases are delivered to the users in bulk DOT containers or DOT-specification containers on MDD vehicles. Bulk containers meet DOT requirements.

The user may transport research quantities (1 gal or less) of materials provided the containers are adequate for normal transport and are adequately labeled.

Communication Policy for Acids and Bases

Packages are marked or labeled according to the appropriate hazard and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Acids and Bases

DOT-specification containers delivered to the user from Receiving or Industrial Gases are labeled using DOT labels.

Materials not labeled with DOT labels and markings must have either the original manufacturer's label or the chemical name and strength, and approximate hazard classification affixed to the container.

Vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Control Policy for Acids and Bases

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Acids and Bases

The following administrative and/or physical controls which serve to mitigate risk during on-site transport are also in effect:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal, but these must be tied down to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department is able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department is able to respond to any emergency at Site 300 within 15 minutes.

9.10 Containment, Communication, and Control Policies and Requirements for Other Category 3 Hazardous Materials

Containment Policy for Other Category 3 Hazardous Materials

Category 3 hazardous materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Other Category 3 Hazardous Materials

Other toxic and hazardous materials are delivered to the users in DOT-Specification containers on MDD vehicles. Research quantities (1 gal or less) of other Category 3 hazardous materials may be transported in non-DOT-Specification containers in the user's pickup trucks provided the containers are adequate for normal transport and are adequately labeled.

Communication Policy for Other Category 3 Hazardous Materials

Packages are marked or labeled according to the appropriate hazard and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Other Category 3 Hazardous Materials

DOT-specification containers delivered to the user from Receiving or Industrial Gases are labeled using DOT labels. Materials not labeled with DOT labels and markings must have either the original manufacturer's label or the chemical name and approximate hazard label (DANGER, WARNING, CAUTION) affixed to the container.

Control Policy for Other Category 3 Hazardous Materials

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Other Category 3 Hazardous Materials

The following administrative and/or physical controls are in effect to mitigate risk during on-site transport:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal, but these must be tied down to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

10. Nonroutine and Routine Hazardous Material Transfers

10.1 Off-Normal Hazardous Materials, Substances, and Wastes Transfers

Arrangements for Off-Normal Transfers

Onsite transfer of some off-normal hazardous materials may require special handling. The group responsible for moving the material (MMS, HWM Division, or MDD) may arrange the following:

- Blockading and access control of onsite or offsite roadways
- PSO escorts
- Use of specialized personnel and operating equipment
- Use of additional Laboratory support (safety, environmental, transportation, criticality, materials accountability, and emergency response)
- Use of outside consultants and specialists
- Transfer during off-shift hours.

Off-normal hazardous materials, substances, and waste transfers meeting criteria specified in Chapter 2 of the *LLNL Health and Safety Manual*. require an OSP, prior approval, and review by the Hazards Control Safety Team.

10.2 Transfer of Oversized Equipment and Packages

Use of the Riggers Group

Packages too large to transport in designated Laboratory transport vehicles are transferred by the Riggers Group in the Plant Engineering Department.

Transfer Requests from Responsible Groups

Transfers are made at the request of the HMPT responsible group (MMS, HWM Division, or MDD) to assure that containment, communication, and controls are adequate to provide safe transfer of the material.

10.3 Vehicle Requirements

Vehicles That Cannot Be Used to Transport Hazardous Materials

Hazardous materials, substances, and/or wastes, excluding analytical samples, may not be transported in bicycle baskets, lab carts, automobiles, or personal vehicles.

Restrictions on Use of Vehicles

Vehicles used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum restricts and requirements:

- No maintenance or refueling is permitted on any vehicle carrying hazardous materials except for emergency situations and only after being reviewed by Hazards Control.
- Vehicles shall not be loaded in excess of their rated weight limit.
- Personnel are permitted to ride in the cab section only.
- No hazardous materials, substances, or wastes are permitted in the cab section.
- DOT hazardous materials compatibility requirements or other LLNL compatibility requirements must be followed.

Use of Forklifts

Forklifts used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum requirements:

- Forklifts must be approved for the load and inspected according to the *LLNL Health and Safety Manual,* Supplement 29.04A.
- Forklifts used to transport hazardous materials, substances, and/or wastes shall not exceed their rated lift capacity or loaded in excess of their rated weight limit. No more than two 55-gal waste drums containing liquids on wooden pallets or four 55-gal waste drums on plastic pallets may be transported on one forklift at a time.
- Only the forklift driver is permitted to ride in the vehicle.
- DOT hazardous materials compatibility requirements or SOP 530 compatibility requirements must be followed.

Swipe Sampling Vehicles

Vehicles used to transport radioactive materials and wastes at Main Site or at Site 300 must be swiped by Hazards Control for radiation contamination on a routine basis after transport of radioactive materials or wastes.

Loading and Unloading Vehicles

Extreme care must be taken in the loading or unloading of any hazardous material. Except for explosives at Site 300, only MMS, MDD, or Plant Engineering personnel under the supervision of MMS can load and unload Category 1 Hazardous Materials.

At Site 300, explosives may be loaded or unloaded by personnel who have been trained and qualified as described in the *LLNL Health and Safety Manual,* Chapter 24, and *Site 300 Safety and Operational Manual*.

Vehicles shall not be loaded or unloaded unless the vehicle motor is turned off, and the parking brake is set.

Large and/or heavy packages must be positioned so that the weight is equally distributed over the width and length of the conveyance. All hazardous materials shall be secured in a manner that assures that it will not move or shift in transit. See the section, “Vehicle Tiedowns” below.

Smoking is not permitted during loading and unloading operations.

Vehicle Tiedowns

Packages shall be secured to the vehicle during transportation.

Personnel are required to use tiedowns whenever possible. Individual components of a tie-down system must be used in the manner for which they were intended and may not exceed their rated capacities. Defective components may not be used, and all slack must be removed before transport.

Hazardous materials must be sufficiently blocked, braced, and/or tied down to prevent any change in position during transport. Packages must be secured in a manner which does not compromise the integrity of the packaging. During delivery operations, tiedowns must be rechecked and, if necessary, re-secured whenever a package is unloaded or the integrity of the tiedown is compromised.

The waste generator is responsible for palletizing Category 2 Hazardous Materials prior to transport by strapping, blocking, bracing, and taping

packages together to prevent any shifting during transport. (See "Placing Waste Containers on Pallets" in **Section 8.5.**)

10.4 Stock Chemical Transfers

Stock Chemicals from Central Supply

MDD orders and issues chemicals on systems-contracting basis (i.e., orders chemicals from a supply vendor and delivers chemicals in DOT packages directly to the user). Chemicals can be issued from Central Supply to users as long as chemicals in aggregate quantities of 5 gal or more are packaged in DOT-approved containers marked and labeled according to the hazard.

Break-bulk Quantities

Break-bulk quantities of chemicals in aggregate quantities less than 5 gal must be from pre-packaged case lots and:

- Packaged in strong, tight containers
- Packaged to prevent inner receptacles from moving
- Marked and labeled according to the hazard
- Accompanied by a Material Safety Data Sheet (MSDS).

10.5 Firearms Transfers

Armed weapons are exempt from normal containment, communication, and control requirements. When transferred, ammunition is packaged separately from weapons in secure, strong, tight boxes. The contents of the packages must also be labeled in a conspicuous manner.

When firearms are transferred, all requirements of the most current DOE Order for Firearms Safety must be observed.

10.6 Transfers of Explosive Shot Assemblies

Onsite transfers of explosive shot assemblies (including NPLA's) between approved facilities require deviations from existing procedures. Because of their configuration and size, explosive shot assemblies are exempt from normal packaging, compatibility, and placarding requirements.

Packaging	Shot assemblies too large to package in approved containers may be transferred without being packaged if hazardous materials are protected within the assembly from an outside direct impact. Also, assemblies containing initiating devices must be shorted when transferred.
Compatibility	Shot assemblies may contain multiple hazards which may be forbidden to be transported together on the same vehicle according to DOT regulations; however, those assemblies may be transferred if individual noncompatible hazards cannot be separated due to the configuration of the assembly.
Placarding	Shot assemblies may contain multiple hazards which may require multiple vehicle placarding according to DOT regulations; however, those assemblies may be transported in vehicles displaying only the Explosive A placard, if applicable.
Applicability of Other Requirements	Except for the special conditions listed above, all other requirements concerning vehicle operations, communication, and controls must be observed to provide for the safe transfer of the material.

11. Personnel Qualifications and Training

11.1 HMPT Training Requirements

Minimum HMPT Safety Training Requirements

Minimum HMPT Safety training consists of on-the-job training under the supervision of a trained and qualified employee, supplemented by Hazards Control safety courses. Minimum personnel training requirements are identified in the individual responsible organization's policies and procedures.

11.2 Training and Qualifications of Explosives Handlers

Management's Responsibility for Explosives Handlers

Supervisors bear the primary responsibility for ensuring that personnel who handle explosives possess the knowledge and skills needed to perform their work.

Training Requirements

Before an employee is authorized to handle explosives at LLNL or Site 300, the employee must understand the hazards and safe practices associated with the work.

In addition to the training required by their own organization, all explosives handlers must, at minimum, complete two Hazards Control courses—HS-2016, Explosives Safety Orientation, and HS-2120, Explosives Transportation Safety.

Annual Review of Explosives Handlers

The supervisor must annually review each explosives handler's qualifications and work assignment to ensure that the person is still capable of performing this job safely. In addition, the review should include discussion of recent changes in pertinent procedures and other matters of concern.

If a supervisor determines that an employee is no longer able to perform explosives handling safely, that employee is not permitted to continue working with explosives.

11.3 Training for Handlers of Radioactive Materials

Specialized Training Requirements for Handlers of Radioactive Materials

All personnel who handle radioactive materials must, at minimum, complete two courses on a biennial basis—HS-6010, Radiation Safety Orientation, and HS-6600, Radiation Survey Instruments—before handling radioactive materials. Retraining is required every two years.

11.4 Training Requirements for Users and Generators of Hazardous Materials

Training for Hazardous Waste Generators

LLNL employees who generate hazardous or radioactive waste must complete EP-0006, Hazardous Waste Handling, and EP-0110, LLW Generation and Certification.

Training for Category 3 Users

Any user of Category 3 Hazardous Materials must, at minimum, complete the course, HS-4050, Health Hazard Communication.

12. Emergency Response, Occurrence Reporting, and Incident Analysis

12.1 Emergency Response

LLNL Emergency Personnel

LLNL maintains a large staff of emergency response personnel, including a Fire Department, Protective Service Officers, a fully staffed medical facility, and ambulatory services.

Emergency Phone Numbers

The telephone number for LLNL's emergency dispatch is 911 and is posted on each telephone at LLNL and Site 300. The Hazards Control telephone number is posted throughout LLNL and Site 300 facilities.

Emergency Communications

There is an onsite communications system specifically for emergency control purposes. It consists of:

- A continuously operated emergency dispatch center for receiving and relaying emergency information
- Reserved telephone lines for reporting emergencies from any onsite telephone to the Emergency Dispatcher
- An automatic signal at the Emergency Dispatch Center to indicate when a local warning system has been activated
- An automatic signal at the Emergency Dispatch Center that indicates when a fire-protection system has been activated
- Systems for notifying emergency response personnel in an emergency
- An emergency Public Address system to relay vital information and instructions to LLNL personnel.

Emergency Response Groups

During an emergency, an LLNL emergency dispatcher (Main Site) or a Protective Services dispatcher (Site 300) uses reserved telephone lines to promptly relay emergency information to the following emergency response groups:

- LLNL Fire Department

- LLNL Security Department
- Hazards Control Safety Team
- Plant Engineering
- Medical facility personnel.

Personnel from these organizations go to the scene of emergencies.

Who's in Charge at the Emergency Scene

At the emergency scene, the Senior Fire Officer is the Incident Commander and coordinates the response of other departments. The Laboratory Emergency Duty Officer (LEDO) is the Crisis Manager who coordinates LLNL's emergency activities with outside agencies. (The LEDO is always a senior management representative who is on-call to the emergency response organization.) Other departments perform support services as requested by the Incident Commander.

LLNL Fire Department

The LLNL Fire Department and other personnel respond to emergencies and incidents involving fires and spills of hazardous materials, substances, and wastes.

Protective Services Officers

Protective Services Officers control traffic, guard the scene, and perform other tasks requested by the Incident Commander.

Hazards Control Safety Team

The Hazards Control Safety Team provides guidance on hazards and their control methods and proceeds with control measures as directed.

The Role of Hazards Control at an Emergency Scene

To assist line management, Hazards Control Safety Teams secure the incident scene to preserve accident conditions while line management notifies the proper organizations and agencies and assembles the Incident Analysis Team.

Self-Help Zones and the Zone Supervisor

The Laboratory is divided into approximately 15 self-help zones. Managers are required to develop self-help plans to be effected during these emergencies. A Zone Supervisor for each zone coordinates and manages emergency activities within that zone.

Assembly Points and Assembly Point Leaders

Within each zone, pre-designated assembly areas have been established where Assembly Point Leaders take local control for ensuring the safety of personnel and facilities.

Periodic Emergency Exercises

To ensure that all LLNL personnel know what to do in the case of an emergency, emergency exercises are conducted periodically.

Laboratory Emergency Preparedness Plan

The *Laboratory Emergency Preparedness Plan* addresses actions for handling large-scale emergencies, such as earthquakes and other natural disasters, that might overtax the Emergency Response Team. LLNL's emergency response program is also detailed in the *LLNL Health and Safety Manual,* Chapter 3, "Emergency Control," and the LLNL Fire Department's *Procedures Manual.*

12.2 Occurrence Reporting

Sources for Occurrence Reporting

LLNL procedures for occurrence reporting and incident analysis comply with DOE Order 232.1. They are documented in LLNL implementing procedures and the *LLNL Health and Safety Manual,* Supplement 4.08, "Incident Analysis Manual." These occurrence reporting procedures are summarized below.

Occurrence Reporting Procedure

After an incident occurs, employees must notify their line managers. Line managers gather preliminary information related to the event or condition and notify higher line management. Line managers also interface with the appropriate organizations to categorize the occurrence in sufficient time to meet DOE requirements.

Role of the LLNL Occurrence Reporting Office

The Laboratory Occurrence Reporting Office of the Laboratory Emergency Preparedness and Response Program assists line management to categorize occurrences, assigns occurrence report numbers, works with the LEDO in making initial or follow-up verbal occurrence reports, and assists line management in submitting three occurrence reports: initial, 10-working-days, and final written occurrence reports.

12.3 Categories of Incidents

Three Categories of Incidents

There are three category classifications of occurrences which require prompt reporting to DOE:

- Emergency
- Unusual Occurrence
- Off-normal Occurrence.

LLNL implementing procedures for DOE Order 232.1 and the LLNL *Emergency Preparedness Plan* list Emergency Action Levels, which define classifications of emergencies (in accordance with the provisions of DOE Order 5500.2A) that are to be categorized as emergency occurrences in compliance with DOE Order 232.1.

Process of Categorizing Reportable Incidents

Line management is responsible for ensuring that a categorization of reportable occurrence is made within two hours. Line management also contacts the LEDO as soon as the reportable occurrence is identified.

The LEDO notifies DOE Facility Representative and DOE Headquarters as appropriate. The LEDO then alerts the DOE-OAK Laboratory Operations Division Duty Officer.

If there is time, the DOE-OAK Laboratory Operations Division assists line management in the occurrence categorization. As soon as categorization has been made, line management contacts the LEDO with the information necessary to make the initial verbal notification.

Verbal Notification

Once an occurrence is categorized, the LEDO notifies the following organizations within the time periods indicated:

<u>Emergency</u>

- The DOE Headquarters Emergency Operations Center and the DOE-OAK Laboratory Operations Division Officer are called within 15 minutes.
- The LLNL Director's Office is notified as soon as possible.

Unusual Occurrence

- The DOE Headquarters Emergency Operations Center and the DOE-OAK Laboratory Operations Division Officer are called within two hours.
- The LLNL Director's Office is notified as soon as possible.

Off-normal Occurrence

- No telephone notification is required. However, the DOE-OAK Laboratory Operations Division Officer and the LLNL Director's Office should be informed that an Off-normal Occurrence has been categorized and that a 24-hour written report will be submitted.

In all cases, the Laboratory Occurrence Reporting Office is notified as soon as practical after the required verbal notifications have been made.

Follow-up Verbal Notification

In addition to the initial verbal notification, the LEDO also makes follow-up notification to DOE and the DOE-OAK Laboratory Operations Division Duty Officer for any of the following:

- Any further degradation in the level of safety or other worsening conditions.
- Any conditions requiring the declaration of emergency at any of three classification levels, if such a declaration has not been made.
- Any change from one emergency classification to another.
- Termination of an emergency.

Initial Notification Reports

Line management is responsible for ensuring that an **initial** written notification **report** is submitted within the time frame specified below:

- Emergency—As soon as possible following categorization but within 24 hours.
- Unusual Occurrence—Within 24 hours.
- Off-normal Occurrence—Within 24 hours or the next working day.

Subsequent Written Reports

Line management is responsible for two subsequent written reports—a 10-working-days report and a final report. All reports must conform to the Occurrence Report format and instructions delineated in LLNL implementing procedures for DOE Order 232.1. Occurrence Reports must be signed by the cognizant Associate Director or his designee.

The **10-working-days report** includes information provided by the DOE-OAK Laboratory Operations Division as well as up-to-date information relating to the root cause, significance, nature, and extent of the event; and corrective and preventative actions.

The **final report** is submitted when the cause of the occurrence has been analyzed, root cause and contributing causes determined, corrective actions determined, and lessons learned identified.

In addition, if significant new information becomes available, line management must submit an **updated report**.

12.4 Incident Analysis

Assembling the Incident Analysis Team

An Incident Analysis Team is assembled whenever the incident or accident conforms to parameters identified in the *LLNL Health and Safety Manual,* Supplement 4.08, "Incident Analysis Manual." Team appointment is made as soon as possible, in writing, and identifies the scope of the investigation. Normally, an Incident Analysis Team is appointed by the line Department Head (or higher level of management) in whose area the incident has occurred or for whom the injured person worked.

The Role of the Incident Analysis Team

The Incident Analysis Team conducts its investigation and submits a written report to line management in accordance with the guidelines described in the "Incident Analysis Manual." Line management reviews the report, formulates and prepares a written plan of corrective action, forwards the plan to the appropriate organizations, and corrects any deficiencies noted in the report.

Types of Investigative Boards

The type of investigating board that is required by DOE Order 5484.1 is summarized below:

1. Type A—Boards are appointed by DOE, contain only DOE or other federal employees, and operate under DOE-prescribed procedures.
2. Type B—Boards are appointed by DOE, may contain either DOE employees or DOE-contractor employees, and operate under DOE-prescribed procedures

3. Type C—Incident Analysis Teams are appointed by Laboratory management and operate under the guidance of *LLNL Health and Safety Manual,* Supplement 4.08.

Incident Analysis Manual

The *LLNL Health and Safety Manual,* Supplement 4.08, "Incident Analysis Manual," describes the procedure for investigating incidents and documenting recommendations to avoid similar occurrences. (A summary of DOE requirements for accident notification, investigation, and reporting is in Appendix A of the "Incident Analysis Manual.")

12.5 Categories of Spills and Emergencies

LLNL Policy on Spills and Emergency Response

Spill and emergency response must protect human health and safety and the environment.

Definition: "Small" Emergency

LLNL separates spills and emergencies into two categories: "small" and "large." LLNL personnel may clean up small spills or respond to minor emergencies, including small fires. A small spill or emergency is defined as (1) the release of material whose nature and potential hazards are known; (2) the release presents no actual or potential threat to human health or safety or the environment; (3) the spill can be cleaned up by one or two people in less than one hour; and (4) the release results in no more than minor injury requiring simple first aid.

Definition: "Large" Emergency

A large spill involves (1) potential contamination of soil or groundwater; or (2) a fire or an explosion. A large spill or major emergency is (1) unsafe to manage without Fire Department assistance; (2) type of material released is unknown; (3) it cannot be cleaned up by two people in less than one hour; (4) injuries require more than simple first aid; and (5) the release migrates to the soil, stormwater, or the sanitary sewer system.

12.6 Spills and Minor Emergency Response

The following spill/fire responses are intended only for eight types of emergencies. Each individual response procedure is further subdivided into a health hazard precaution, fire-fighting procedures, spill-response procedures, and proper protective equipment.

Note: Employees who are uncertain about their ability to safely manage a spill or fire should dial 911 immediately for help.

Acids

Hazards: Vapors from acids may be irritating and can cause severe burns to skin, eyes, and mucous membranes.

Fire: Some acids are flammable.

Cleaning up Small Acid Spills: DO NOT ATTEMPT TO CLEAN UP AN ACID SPILL GREATER THAN 1 GALLON.

1. For acid spills of less than 1 gallon, use an absorbent material to pick up the spilled liquid acid. Do not use towels or rags because spontaneous ignition could occur.
2. Neutralize residual acid by sprinkling the area with sodium carbonate (soda) and enough water to make a slurry.
3. Allow the slurry of sodium carbonate and water to sit until the addition of fresh sodium carbonate produces no further foaming.
4. Use absorbent material to pick up neutralized acid for disposal with the following exception: If the spill contains hydrofluoric acid, use gypsum (calcium sulfate) to absorb the spill. Do not use the usual absorbent material to clean up a spill of hydrofluoric acid because silicates react with hydrofluoric acid to produce silicon tetrafluoride, a corrosive gas.
5. Wash the spill area with soap and water.
6. Dispose of your contaminated clothing and absorbent material as hazardous waste.

Cleaning up Large Acid Spills:

1. Leave the immediate area. Contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.

3. If possible, use absorbent material, rags, or towels to contain the spill, but proceed with extreme caution.

Personal Protection:

- Avoid contact with the acid and stand upwind.
- Wear neoprene or Silver Shield gloves, a full-face respirator with acid/organic vapor cartridges, and other equipment to prevent acid contacting with the body.
- If acid contacts the skin, remove contaminated clothing, and flood the skin with water. Wash affected skin thoroughly with soap and water.
- If acid comes in contact with the eyes, hold the eyes open, and flush with water. Seek medical attention.
- Any contact or exposure to hydrofluoric acid should be immediately treated by Health Services.

Aqueous Hazardous Materials

Hazard: Vapors from aqueous hazardous materials may be irritating.

Fire: Aqueous materials are nonflammable.

Cleaning up Small Spills of Aqueous Hazardous Materials: DO NOT ATTEMPT TO CLEAN UP A SPILL GREATER THAN 1 GALLON.

1. For spills of less than 1 gallon, absorb the liquid spill using absorbent materials.
2. Wash the spill area with soap and water.
3. Dispose of contaminated clothing and the absorbent material as hazardous waste.

Cleaning up Large Spills of Aqueous Hazardous Materials:

1. Leave the immediate area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.
3. If possible, use absorbent material, rags, or towels to contain the spill, but proceed with extreme caution.

Personal Protection:

- Avoid contact with the waste and stand upwind.
- Wear neoprene, Silver Shield, or butyl rubber gloves; a full-face respirator with combination acid gas/organic vapor cartridges; and other equipment to prevent contact with the body.

- If an aqueous hazardous substance comes in contact with the skin, remove all contaminated clothing, and flood the skin with water. Wash all affected skin thoroughly with soap and water.
- If an aqueous hazardous substance comes in contact with the eyes, hold the eyes open, and flush with water.
- Seek immediate medical attention.

Caustics

Hazards: Caustics can cause severe burns to eyes, skin, and mucous membranes.

Fire: Caustics are nonflammable.

Cleaning up Small Spills of Caustics: DO NOT ATTEMPT TO CLEAN UP A SPILL GREATER THAN 1 GALLON.

1. For spills of less than 1 gallon, use absorbent material to pick up the liquid spill.
2. Wash the spill area with soap and water.
3. Dispose of your contaminated clothing and the absorbent material as hazardous waste.

Cleaning up Large Spills of Caustics:

1. Leave the immediate area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.
3. If possible, use absorbent material, rags, or towels to contain the spill, but proceed with extreme caution.

Personal Protection:

- Avoid contact with the waste and stand upwind.
- Wear neoprene or Silver Shield gloves, a full-face respirator with combination acid gas/organic vapor cartridges, and other equipment to prevent contact with the body.
- If caustics come in contact with the skin, remove all contaminated clothing, and flood the skin with water.
- If caustics come in contact with the eyes, hold the eyes open, and flush with water.
- Seek medical attention.

Flammable Liquids

Hazards: Vapors from flammable liquids can cause dizziness and narcosis. Flammable liquids can be absorbed through the skin.

Fire: Extinguish fires of flammable liquids with a dry chemical, carbon dioxide, or Halon fire extinguisher. Be aware that such fires may appear to be extinguished, but a flashback may occur along the vapor trail and re-ignite it. Water may be ineffective on this type of fire. Water spray may be useful in knocking down vapors.

Cleaning up Small Spills of Flammable Liquids: DO NOT ATTEMPT TO CLEAN UP A SPILL GREATER THAN 1 GALLON.

1. For spills of less than 1 gallon, remove all sources of ignition.
2. Use absorbent materials, rags, or towels to absorb the liquid.
3. Seal your contaminated clothing and the absorbent material in a vapor-tight container for eventual disposal as hazardous waste.

Cleaning up Large Spills of Flammable Liquids:

1. Contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.
3. If possible, use absorbent material, rags, or towels to contain the spill, but proceed with extreme caution.

Personal Protection:

- Avoid contact with the waste and stand upwind.
- Wear Silver Shield or butyl rubber gloves, and a full-face respirator with other equipment to prevent contact with the body.
- If a flammable liquid comes in contact with the skin, remove all contaminated clothing, and flood the skin with water. Wash all affected areas thoroughly with soap and water.
- If a flammable liquid comes in contact with the eyes, hold the eyes open, and flush with water.
- Seek medical attention.

Flammable Solids

Hazards: Metal hydrides cause severe caustic burns. These compounds may be extremely toxic.

Fire: Extinguish fires with Metal-X or similar solid fire extinguisher. Do not use carbon dioxide, Halon, or water as a violent reaction may occur.

Spills of Flammable Solids: DO NOT ATTEMPT TO CLEAN UP A SPILLS OF THIS MATERIAL.

1. Leave the immediate area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.

Personal Protection: DO NOT ATTEMPT TO CLEAN UP THESE MATERIALS.

- If flammable solids come in contact with the skin, remove all contaminated clothing, and flood the skin with water. Wash all affected areas thoroughly with soap and water.
- If flammable solids come in contact with the eyes, hold the eyes open, and flush with water.
- Seek medical attention.

Oxidizers

Hazards: Vapors from oxidizers may be irritating. Oxidizers can cause severe burns to skin, eyes, and mucous membranes. Contact with chronic acid may result in slow-healing sores.

Fire: Oxidizer compounds are not flammable by themselves, but their presence can intensify adjacent fires or cause spontaneous ignition upon contact with organic materials. Use the type of fire extinguisher appropriate for the type of adjacent burning material.

Cleaning up Small Spills of Oxidizers: DO NOT ATTEMPT TO CLEAN UP A SPILL GREATER THAN 1 GALLON.

1. For spills of less than 1 gallon, use absorbent material to pick up the liquid spill. Do not use towels or rags because spontaneous ignition could occur.
2. Have your contaminated clothing and the absorbent material evaluated by the Safety Team. The clothing and the absorbent material may be disposed of as hazardous waste.
3. Dilute the spill with an equal volume of water.
4. Check the pH and proceed according to the pH results.

   If the oxidizer is acidic, neutralize residual acid by sprinkling the area with sodium carbonate (soda) and enough water to make a slurry.
5. Allow the slurry of sodium carbonate and water to sit until the addition of fresh sodium carbonate produces no further foaming.

6. Use absorbent material to pick up neutralized acid.
7. For caustics, use absorbent material to pick up the liquid spill.
8. Prevent the spill from reaching and mixing with organic materials.
9. For either acid or caustic, wash the spill area with soap and water.

Cleaning up Large Spills of Oxidizers:

1. Leave the immediate area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.
3. If possible, use absorbent material, rags, or towels to contain the spill, but proceed with extreme caution.

Personal Protection:

- Avoid contact with the waste and stand upwind.
- Wear neoprene or Silver Shield gloves, a full-face respirator with combination acid gas/organic vapor cartridges, and other equipment to prevent contact with the body.
- If oxidizers come in contact with the skin, remove all contaminated clothing, and flood the skin with water.
- If oxidizers come in contact with the eyes, hold the eyes open, and flush with water.
- Seek medical attention.

Other Toxic Materials

Hazards: Other toxic materials may be poisonous.

Fire: Extinguish fires of other toxic materials with a dry chemical, carbon dioxide, or Halon fire extinguisher.

Spills of Other Toxic Materials: DO NOT ATTEMPT TO CLEAN UP SPILLS OF THIS MATERIAL.

1. Leave the contaminated area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and to vehicular traffic until the Fire Department arrives.

Personal Protection: DO NOT ATTEMPT TO CLEAN UP THESE MATERIALS.

- If toxic materials come into contact with the skin, remove all contaminated clothing, and flood the skin with water. Wash all affected areas thoroughly with soap and water.

- If other toxic material comes in contact with the eyes, hold the eyes open, and flush with water.
- Seek medical attention.

PCB-Contaminated Materials

Hazards: PCBs and PCB-contaminated materials (e.g., waste oil from electrical transformers and other equipment) are poisonous and may be carcinogenic.

Fire: Extinguish fires with a dry chemical, carbon dioxide, or Halon fire extinguisher. Water may be ineffective on this type of fire.

Cleaning up Small Spills of PCBs: DO NOT ATTEMPT TO CLEAN UP A SPILL GREATER THAN 1 QUART.

1. For spills of less than 1 quart, FIRST REMOVE ALL SOURCES OF IGNITION.
2. Then use absorbent material, rags, or towels to absorb the liquid.
3. Wash any surfaces contaminated with PCBs with a strong soap-and-water solution.
4. Seal your contaminated clothing and absorbent material in a vapor-tight container for eventual disposal as hazardous waste.
5. Allow an Environmental Analyst to inspect the area before resuming activities. **Note:** All spill sites must be sampled after cleanup.

Cleaning up Large Spills of PCBs:

1. Leave the immediate area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and vehicular traffic until the Fire Department arrives.
3. If possible, use absorbent material, rags, or towels to contain the spill, but proceed with extreme caution.

Personal Protection:

- Avoid contact with the waste and upwind.
- Wear Viton gloves or equivalent, full-face respirator with organic vapor cartridges, and other equipment to prevent body contact.
- If PCB-contaminated materials come in contact with the skin, remove all contaminated clothing, and flood the skin with water. Wash all affected areas thoroughly with soap and water.

- If PCB-contaminated materials come in contact with the eyes, hold the eyes open and flush with water.
- Seek medical attention.

Radioactive Materials

Fire: Do not attempt to extinguish any fires containing radioactive materials. Call the LLNL Fire Department at 911 immediately.

Spills: DO NOT ATTEMPT TO CLEAN UP A RADIOACTIVE SPILL.

Personal Protection: Do not attempt to clean up these materials. Wait for the Fire Department and avoid spreading contamination.

Unidentified Hazardous Materials

Hazards: Because the hazard is unknown, all hazards are possible.

Fire: Do not attempt to put out fires containing unknown materials.

Spills: DO NOT ATTEMPT TO CLEAN UP A SPILL OF AN UNIDENTIFIED MATERIAL.

1. Leave the contaminated area, and contact the LLNL Fire Department at 911.
2. Cordon off the area to personnel and to vehicular traffic until the Fire Department arrives.
3. Contact any personnel who may have knowledge of the material.

Personal Protection:

- Avoid contact with the waste and stand upwind.
- Wear neoprene or butyl rubber gloves, a full-face respirator with combination acid gas/organic vapor cartridges, and other protective equipment to prevent contact with the body.
- If an unidentified hazardous material comes in contact with the skin, remove all contaminated clothing, and flood the skin with water. Wash all affected areas thoroughly with soap and water.
- If an unidentified hazardous material comes in contact with the eyes, hold the eyes open and flush with water. Seek medical attention.

12.7 Vehicular Accidents and Emergencies Where Explosive Materials Are Present

Emergencies

In the event of a fire or accident involving a vehicle carrying explosives off-site, the "Special Instructions For Motor Vehicle Drivers" must be followed.

In the event of a fire or accident involving a vehicle carrying explosives on-site, notify the Emergency Control Personnel as soon as possible by radio or telephone, Extension 33 (Site 300) or Extension 2-7333 (Livermore) and adhere to the following procedures as appropriate.

For a Vehicle Accident with Spilled Explosives and No Fire

If you are involved in an vehicular accident where explosives are spilled but there is no fire:

- Shut off ignition of the vehicles involved.
- **Do NOT smoke** or use highway flares within 50 ft of vehicles or the explosives.
- Set up road warnings using signs or available personnel.
- Give aid and assistance to any injured people.
- Prevent people and vehicles from moving through spilled explosives. Close a lane or the entire roadway as required.
- Avoid rough handling of explosives containers.
- Gather any spilled explosives, place them in an isolated spot away from people and vehicles, and identify the explosives by any available method.
- In the event of a time delay in obtaining another vehicle, the person responsible for the explosives may do the following if the damaged vehicle creates a hazardous situation:
  - Remove the explosives from the damaged truck and carry them to an isolated, safe location.
  - Block off the area around the explosives, and identify the explosives with signs.
  - Have the damaged vehicle removed.

For a Vehicle Fire or Accident with Fire

If you are involved in an vehicular fire or an accident where explosives are present:

- Act promptly to extinguish electrical fires in the motor compartment if it can be done with minimum risk.

- If the fire is outside the motor compartment involves fuel or rear tires, or if the fire is threatening the explosives cargo, evacuate all personnel to the appropriate distance specified in Table 1 of *LLNL Health and Safety Manual*, Supplement 24.30. If the table is not available, evacuate to a distance of 2,000 ft. **DO NOT ATTEMPT TO FIGHT THIS FIRE.**
- Give all available information concerning the weight and types of explosives involved to responding emergency personnel.

For an Accident with No Fire and No Spill

If you are involved in an vehicular accident where explosives are present, but there is no fire and no spill of explosives:

- Shut off the ignition of the vehicles involved.
- **Do NOT smoke** or use highway flares within 50 ft of explosives-carrying vehicle.
- If any containers are broken or are leaking, treat as described above for a vehicle accident with spilled explosives.

13. Transportation Vehicle Operations

13.1 Transportation Operations

MMS Transport of Category 1 Materials

At the Main Site and at Site 300, MMS transports Category 1 Hazardous Materials in MMS vehicles or authorizes hand carrying of small quantities of Category 1 Material in accordance with MMS Handcarry Procedure MM-VI-10. MMS is responsible for assuring proper containment, communication (i.e., labeling and placarding), and packaging.

HWM Transport of Category 2 Materials

Category 2 Hazardous Materials can only be transferred from WAAs in an HWM-owned truck driven by HWM technicians except at Site 300.

At Site 300 wastes located at a WAA within 500 feet of HWM Division's TSDF may be transported by forklift by HWM personnel. The HWM Technician is responsible for assuring proper containment, communication (i.e., labeling and placarding), packaging, and palletizing the wastes before transfer.

MDD Transport of Category 3 Materials

At the Main Site and Site 300, MDD transports Category 3 Hazardous Materials in the original DOT packages to the user from the Receiving Area using MDD vehicles and observing the following conditions.

- No repackaging or removal of labeling or markings is permitted.
- Damaged containers are repackaged in DOT-specification containers or other approved containers.

Table 9-2 lists the MDD vehicles used to transfer hazardous materials onsite.

User Transport of Category 3 Materials

The user may pick up and transport Category 3 Hazardous Materials from the receiving area in a pickup truck. MDD ensures that packages are adequately tied down.

13.2 Loading and Unloading Operations

Policy: Loading and Unloading Hazardous Materials

LLNL employees must take extreme care when any hazardous material is loaded or unloaded from vehicles.

Responsibility for Loading/ Unloading Category 1 Materials

Except for explosives at Site 300, only MMS, MDD, or Plant Engineering personnel under the supervision of MMS can load and unload Category 1 Hazardous Materials.

At Site 300, explosives may be loaded or unloaded by personnel who are trained and qualified, as described in the *LLNL Health and Safety Manual*, Chapter 24, and *Site 300 Safety and Operational Manual*.

Responsibility for Loading/ Unloading Categories 2 and 3 Materials

Only HWM or MDD personnel who are trained and qualified as described in the *LLNL Health and Safety Manual* can load and unload Category 2 and 3 hazardous materials from MDD vehicles.

Loading/ Unloading Requirements

Drivers and transport personnel are responsible for ensuring the following requirements are observed during loading and unloading operations of hazardous materials:

- Smoking is not permitted during loading and unloading operations.
- Vehicles shall not be loaded or unloaded unless the vehicle motor is turned off, and the parking brake is set.
- Explosives vehicles parked on a grade must also use a wheel chock.
- Large and/or heavy packages must be positioned so that the weight is equally distributed over the width and length of the conveyance.
- Forklifts used to transport hazardous materials, substances, and/or wastes shall not exceed their rated lift capacity.

13.3 Vehicle Safety Requirements

Vehicles used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum safety requirements:

- Daily vehicle inspection must be performed as per **Section 13.5.**
- Vehicles (except user vehicles and forklifts) used to transport hazardous materials and substances must, at a minimum, be equipped with a fire extinguisher and spill kits for emergencies.
- Vehicles (except user vehicles and forklifts) must be supplied with DOT compatibility charts and emergency response information from the guide book.
- Vehicles transferring hazardous materials onsite shall be placarded as per the applicable DOT requirements
- No maintenance or refueling is permitted on any vehicle carrying hazardous materials except for emergency situations and only after being reviewed by Hazards Control.
- Vehicles shall not be loaded in excess of their rated weight limit.
- Personnel are permitted to ride in the cab section only unless otherwise approved by the Division Leader of the responsible division.
- No hazardous materials, substances, or wastes are permitted in the cab section.
- DOT hazardous materials compatibility requirements must be followed.
- The user may transport only those packages assigned to him or her.

Note: Vehicles used to transport Category 1 Hazardous Materials shall not be left unattended during the transportation process.

Vehicles Used to Transport Explosives

Vehicles used to transport explosives at the Main Site and/or at Site 300 must also meet the following additional minimum requirements:

- Vehicles must be equipped, approved, and inspected according to *LLNL Health and Safety Manual,* Supplement 24.05.
- Before new vehicles are placed into service, they shall be inspected by Fleet Management and Hazards Control Explosives Safety personnel.

- Routine vehicle maintenance is required as per the automotive fleet service schedule.
- Explosive-contaminated waste water must be handled according to Site 300 Procedure #403, "Operation of Tank Truck Carrying Waste Water from Explosives Processing and Photo Rinse Operations."

Vehicles Used to Transport Radioactive Materials

Drivers and vehicles used to transport radioactive materials and wastes at the Main Site and/or at Site 300 must also meet the following additional minimum requirements:

- Drivers transporting radioactive materials must be trained to use emergency supplies. **Note:** A driver on the hazardous waste run does not require training if the accompanying Hazardous Waste Technician is trained.
- Vehicles must be swiped by Hazards Control for radiation contamination on a routine basis after transport of radioactive materials or wastes.

Forklift Requirements

Forklifts used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum requirements:

- Forklifts must be approved for the load and inspected according to the *LLNL Health and Safety*, Supplement 29.04A.
- Forklifts used to transport radioactive materials and/or wastes are swiped routinely by Hazards Control or after use.
- Forklifts shall not be loaded in excess of their rated weight limit. No more than two 55-gal waste drums containing liquids on wood pallets or four 55-gal waste drums on PDQ plastic pallets may be transported on one forklift at a time.
- Only the forklift driver is permitted to ride in the vehicle.
- DOT hazardous wastes compatibility requirements must be followed.
- Forklifts used to transport industrial gases are equipped with turn signals and gases are transported in special loading cages.
- Forklifts used for explosives must be approved and stenciled "High Consequence/HE Approved."

13.4 Vehicle Tiedowns

All material, including hazardous materials, must be sufficiently blocked, braced, and/or tied down to prevent any change in position during transport. Packages must be secured in a manner which does not compromise the integrity of the packaging. During delivery operations, tiedowns must be rechecked and, if necessary, re-secured whenever a package is unloaded or the integrity of the tiedown is compromised.

Minimum Requirements for Tiedowns

Tiedowns used on vehicles that transport Categories 1, 2, or 3 materials at the Main Site and/or at Site 300 must also meet the following minimum requirements:

- Vehicles used to transport hazardous materials, substances, and/or wastes are equipped with tiedowns that meet or exceed DOT requirements.
- Personnel are required to use these tiedowns whenever possible.
- Individual components of a tiedown system must be used in the manner for which they were intended and may not exceed their rated capacities.
- Defective components may not be used.
- All slack must be removed from the tiedowns before transport.
- Packages shall be secured to the vehicle during transportation.

Preparation Requirements for Category 2 Hazardous Materials

The waste generator is responsible for palletizing Category 2 Hazardous Materials prior to transport by strapping, blocking, bracing, and taping packages together to prevent any shifting during transport. HWM Division inspects packages and pallets prior to waste pickup.

13.5 Maintenance and Inspection

Fleet Management Inspection Schedule

LLNL has established a routine inspections for all vehicles used to transport any material, including hazardous materials. **Table 13-1** provides the inspection schedule for these vehicles and indicates who performs the inspection. The results of all LLNL vehicle inspection are maintained by the Fleet Management Group.

Table 13-1. Inspection schedule and inspection responsibilities for HMPT vehicles.

Type of Vehicle	Minimum Inspection Schedules				
	Daily[a]	**Every 2 mo**	**Every 3 mo**	**Every 4 mo**	**Once a year**
Category 1 transport vehicles	Driver	Fleet Management Group			Fleet Management Group
Category 2 transport vehicles	Driver		Fleet Management Group		CHP[b]
Category 2 HWM forklifts	Driver	Fleet Management Group		Fleet Management Group	
Category 3 transport vehicles	Driver			Fleet Management Group	CHP[b]
–Site 300	Driver	Fleet Management Group			
–Main Site	Driver			Fleet Management Group	
User Vehicles					Fleet Management Group

a Drivers must inspect their vehicles daily before the vehicle is used to transport hazardous materials. Inspections are to be documented on a Vehicle Inspection Form (**Figure 13-2**).

b California Highway Patrol (CHP) inspects vehicles only if used to transport hazardous waste.

Daily Vehicle Inspection Forms

Daily vehicle inspections are also performed before material transfers are conducted. The results are documented on the Vehicle Inspection Form (**Figure 13-1**). A sample of the Vehicle Inspection Form must remain in the cab when the vehicle is in use. Copies of the multipart form are available through Stores.

Hazardous Materials Loading Checklist

Drivers must complete a Hazardous Materials Loading Checklist (**Figure 13-2**) for onsite transfers of hazardous materials (except on vendor or private carrier vehicles used to pick up one-time receivables from the Receiving or Industrial Gas areas). The inspection includes checking individual packages for damage or leaks. Adherence to tiedown requirements and communication requirements are also noted on the form. Transfers not conforming to requirements are rejected and noted.

LLNL Vehicle Inspection Report
Must be in cab at all times including Hazardous Material Transport
(Check any defective item with X and give details)

Organization_____ Date _____ Pre-Trip ❑
Tractor/Truck_____ Trailer _____ Post-Trip ❑
Dolly _____ Trailer _____ Odometer Reading _____

TRACTOR/TRUCK:

❑ Air Compressor & Lines	❑ Generator/Alternator	❑ Fire Extinguisher(s)
❑ Battery	❑ Heater/Defroster	❑ [illegible]gs, Flares, Fuses
❑ Brakes:	❑ Horn	❑ Spare Bulbs & Fuses
❑ Service Brake	❑ Lights:	❑ Springs/Suspension System
❑ Parking Brake	❑ Head Lights	❑ [illegible] Mechanism
❑ Fluid Leaks	❑ Back-up Lights	❑ [illegible] Properly Inflated)
❑ Cargo Securing Devices	❑ Brake Lights	❑
❑ Clutch	❑ Four Way Flashers	❑ Cuts
❑ Doors	❑ Marker Light	❑ Tread
❑ Drive Line	❑ Tail Lights	❑ Transmission
❑ Electrical Wires	❑ Turn Signals	❑ Wheels:
❑ Engine:	❑ Mirrors	❑ Lugs
❑ Belts & Hoses	❑ Mud Flaps	❑ Rims
❑ Fluids	❑ Muffler/Exhaust System	❑ Seals Leaking
❑ Reasonably Clean	❑ Placards (If required)	❑ Windows
❑ Fifth Wheel	❑ Reflectors	❑ W/S Wipers & Washer
❑ Front Axle	❑ Safety Equipment:	❑ Other (Explain below)
❑ Fuel Tanks & Lines	❑ Emergency Triangles (3)	

TRAILER:

❑ Brake Connections	❑ Landing Gear	❑ Tarpaulin
❑ Brakes	❑ Lights	❑ Tires
❑ Coupling Devices & Chains	❑ Reflectors	❑ Wheels
❑ Hitch	❑ Springs	❑ Other (Explain below)

ADDITIONAL REQUIREMENTS WHEN TRANSPORTING EXPLOSIVES ON SITE:

❑ Maintenance inspection within 120 [illegible]	❑ Wheel chock block
❑ No sharp projections in cargo area	❑ Rear vision mirrors (one on each side)
❑ Two fire extinguishers (inside & outside cab)	❑ Battery quick-disconnect switch

ADDITIONAL REQUIREMENTS WHEN TRANSPORTING EXPLOSIVES OFF SITE:

❑ Two-way radio (Not with blasting [illegible])	❑ No flame producing emergency devices
❑ Fire resistant tarp for dual [illegible] vehicle	❑ Railroad crossing sign
❑ Space fuses, bulbs and headlamp	❑ Flashlight

REMARKS: _____

_____

_____

CHECK HERE IF CONDITION OF THE ABOVE VEHICLE(S) IS SATISFACTORY

Driver Making Report_____ (Signature)
Mechanic Making Repairs_____ (Signature)
Accepting Driver_____ (Signature)

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Figure 13-1. Vehicle inspection form.

Hazardous Materials Loading Checklist
Transporting On-Site

Vehicle No.: _____ **Date:** _____ **Quantity** _____

Shipping Paper No.:_____ **Pickup Location**_____

Material Type: _____ **Delivery Location**_____

Prior to Loading Vehicle	**Yes**	**No**	**Remarks**
1. Vehicle safety inspection performed			
2. Container **not** damaged or leaking			
3. Container cover secured			
4. Container contents identified			
5. Weight within vehicle rating limit			

After Loading Vehicle	**Yes**	**No**	**Remarks**
6. Weight is properly distributed			
7. Load is secured to prevent movement			

Documents to be Carried with Driver	**Yes**	**No**	**Remarks**
8. Motor vehicle inspection			
9. Hazardous material loading checklist			
10. Shipping papers (identifies material)			
11. Emergency Response Guidebook			
12. DOT Compatibility chart			

[ ] Accepted

[ ] Rejected

Vehicle Loaded by: _____ Organization:_____

If rejected, explain below:

Comments

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Figure 13-2. Hazardous materials loading checklist.

14. Additional Environmental, Safety, Health, and Quality Assurance (ES&H/QA) Functions

14.1 Senior Management Council

Members and Purpose

The Senior Management Council (SMC) advises the Laboratory Director on Laboratory policies and oversees the effectiveness of activities and programs to implement these policies. The SMC is chaired by the Director and is composed of the Deputy Director, Deputy Director of Operations, Laboratory Executive Director, and LLNL Associate Directors. With respect to ES&H matters, the SMC periodically reviews Laboratory ES&H policies and reviews the effectiveness of their implementation.

14.2 ES&H/QA Working Group

The ES&H Working Group supports the SMC. The ES&H/QA Working Group is composed of:

- An Assurance Officer from each programmatic directorate
- The heads of the Environmental Protection, Hazards Control, and Health Services Departments
- The Assurance Review Office
- Environmental counsel.

The Working Group is chaired by one of its members and reports to the chairman of the SMC. The Working Group's broad membership and close association with the SMC provide a key mechanism for review proposed ES&H policies and implementing effective ES&H guidance.

Activities and Functions

The Working Group helps to identify and address policy issues concerning environmental protection, safety, health, and quality assurance at LLNL. It provides a means for communicating policy issues to the Laboratory programs, providing a forum for program input, and for developing recommendations to the SMC.

The activities of the Working Group include but are not limited to:

- Responding to requests for reviews and studies from the ES&H/QA Council
- Addressing ES&H/QA issues raised by the programs and preparing recommendations for consideration by the ES&H/QA Council
- Reviewing generic or institutional ES&H/QA issues, and bringing these to the attention of the ES&H/QA Council with recommendations for policy change.

14.3 Programmatic Assurance Offices

Each AD appoints an Assurance Manager who oversees ES&H activities within the directorate and reports to the AD or Deputy AD with direct access to the AD. The Assurance Manager provides oversight of the directorate's ES&H activities and assists the Program in developing plans and procedures to ensure all directorate activities comply with Laboratory and directorate ES&H policies. The Assurance Managers are members of the ES&H Working Group.

Assurance Review Office

The Assurance Review Office (ARO) conducts independent, internal ES&H appraisals to assure that Laboratory ES&H policies and their implementation are consistent with Laboratory requirements, DOE Orders, and ES&H regulations. The ARO head reports to the Laboratory Executive Officer.

14.4 Quality Assurance and Control

LLNL has a Laboratory-wide Assurance Program that covers all hazardous materials, substances, and wastes, including their on-site transfer. The Laboratory's Assurance Program is documented in the *LLNL QA Manual*. The *HMPT QA Plan* defines the overall management of the LLNL QA Program for Hazardous Material Packaging and Transportation Safety (i.e., HMPT Safety Program). This *HMPT QA Plan* makes quality assurance a systematic approach to work-management as required by the *LLNL QA Manual.* As implemented, the *HMPT QA Plan*

provides confidence that the HMPT Safety Program objectives are achieved with due consideration for ES&H protection.

Objective of the HMPT QA Plan

The objective of the *HMPT QA Plan* is to ensure Laboratory-wide compliance with applicable regulations and provide confidence that hazardous materials, substances, and wastes will be safely packaged:

- For shipping by commercial carrier, DOE, other government agencies, or LLNL
- As received at LLNL
- During on-site transfer.

How the HMPT Safety Program and the *HMPT QA Plan* Work Together

The HMPT Safety Program and HMPT QA Plan apply to all activities at Livermore and Site 300 that can affect the containment of hazardous materials, substances, and wastes in transportation. They apply to:

- The integrity of containers for shipping hazardous materials, substances, and wastes in the public domain
- The integrity of packaging in on-site transfers of hazardous materials, substances, and wastes custody
- The identification of hazardous materials, substances, and wastes in containers and packaging.

Note: The HMPT Safety Program does not apply to processing or storage of hazardous materials, substances, and wastes.

Principal Participants of the HMPT Safety Committee

MMS, HWM Division, and MDD are the principal participants of the Hazardous Material Packaging and Transportation Safety Committee.

Responsibilities of the Principal Participants

Each principal participant is responsible for performing HMPT Program work in accordance with a specific QA Plan. The Plans have been written as prescribed in the *HMPT QA Plan* to address the organization's HMPT Safety Program responsibilities, functions and requirements. (Refer to M-078-91, *Materials Management QA Plan for Hazardous Material Packaging and Transportation*; M-078-92, *Hazardous Waste Management QA Plan*; and M-078-92, *Materials Distribution QA Plan for Hazardous Material Packaging and Transportation.*)

Principal participants are responsible for monitoring activities related to their assigned categories of hazardous material to promote HMPT Safety

Program compliance. As requested, they will advise participating LLNL groups on program and regulatory requirements and provide guidance in obtaining technical assistance (e.g., container design and design reviews).

MMS's Responsibilities

Specifically, MMS is responsible for:

- Applying for Category 1 Hazardous Materials container certification and shipping classifications for new explosives
- Packaging selected Category 1 Hazardous Materials hazardous materials
- Category 1 Hazardous Materials transportation per established practice and as requested
- Container selection
- Serving as the Laboratory interface with the DOE for DOE-furnished shipping of nuclear components and special assemblies.

HWM Division's Responsibilities

HWM Division is responsible for:

- Applying for Category 2 Hazardous Materials container certification
- Packaging Hazardous Waste Management Division-generated Category 2 Hazardous Materials
- Collecting Category 2 Hazardous Materials from Waste Accumulation Areas (WAAs)
- Container selection
- Releasing loaded Category 2 Hazardous Material containers to the Traffic Manager for shipping.

MDD's Responsibilities

MDD is responsible for:

- Applying for Category 3 Hazardous Materials container certification
- Receiving, packaging, and the transfer of Category 3 hazardous materials
- Providing transportation services for other categories, on a request basis.

Other HMPT Support Groups

Other LLNL groups that might design, modify, request to procure, fabricate, maintain, or load a container for shipping, or package hazardous materials, substances, and wastes for transfer, must do so in accordance with the *HMPT QA Plan* and referenced regulations and standards. These

functions are performed in accordance with a specific QA Plan, written as prescribed the *HMPT QA Plan*. However, a Plan is not required if container procurement is the only HMPT Program activity.

Specific requirements for principal participant QA Plans are specified in the *HMPT QA Plan*. Document control of QA Plans and supporting documents and procedures are also addressed in the participant QA Plans.

14.5 Quality Assurance Appraisals

Purpose and Time of QA Appraisals

The HMPT Safety Committee conducts QA appraisals of HMPT Safety Program participants to evaluate the state of the Program throughout the Laboratory. Each participant is investigated as often as stipulated in applicable regulatory documents and, as a minimum, once every four years.

QA Appraisal Teams

QA appraisals are planned, performed and reported (in writing) by teams of at least two members, who, as teams, have the appraisal (or auditing) experience and understanding of management necessary to perform credible investigations and evaluations of participants' HMPT Safety Program activities.

Written Appraisal Reports

Upon completion of investigations, the team submits a written Appraisal Report of its findings and observations (and any recommendations) to the HMPT Safety Committee, with a copy to the individual(s) responsible for the investigated work.

Responding to the Appraisal Report

The HMPT Safety Committee ensures that the individuals responsible for the investigated work document and execute acceptable plans of corrective action. The HMPT Safety Committee chairman closes out each QA appraisal in writing when the Appraisal Report has been accepted by the HMPT Safety Committee.

Corrective Action

The HMPT Safety Committee follows up on corrective actions to ensure execution, documentation, and results as planned. The Committee reviews and accepts the documentation and results of each action, and may initiate independent verification of results. When an action item has been completed and accepted, the HMPT Safety Committee chairman closes out that item in writing.

HMPT Safety Program Appraisals

The HMPT Safety Committee will, from time to time, arrange for qualified personnel from other institutions to perform appraisals of selected parts of the HMPT Safety Program. The purpose is to strengthen the LLNL HMPT Safety Program through interactions with experts working in hazardous material packaging and transportation, but under different institutional management systems. The HMPT Safety Committee ensures that the individuals responsible for work investigated by external appraisal teams document and execute acceptable plans of corrective action.

Inter-laboratory Peer Reviews

The Los Alamos National Laboratory (LANL) and LLNL have agreed through a Memorandum of Understanding (MOU) to a perform periodic reciprocal appraisals of the hazardous materials packaging and transportation programs. The appraisals shall be documented in a written report, and shall include recommendations or suggestions for improvement, when warranted. The HMPT Safety Committee ensures that the individuals responsible for work investigated by external appraisal teams are corrected.

14.6 Quality Assurance (QA) Records Control

Types of QA Records

Records meeting the definition of "Quality Assurance Records" (see **Appendix A, Glossary**) are controlled under the Quality Assurance (QA) Plans for MMS, HWM Division, and MDD. Below is a summary of the QA records referred to the QA Plans:

- Approved current revision documents
- Evidence of formal work controls and QA Plan and System upkeep

- Results of work
- Other documentation as designated by the appropriate Division Leader.

Retention Period for QA Records

In general, QA records are retained for a minimum of three years. The Division Leader, however, may issue directives limiting or extending the record retention period for specific records. Requirements for QA records are provided in the individual QA plans.

14.7 QA Records Files and File Maintenance

MMS QA Records

For MMS, the Division Leader establishes QA records files, specifies the types of QA records to be kept in each file, and designates the "Responsible Person" to maintain the QA Records File.

HWM Division QA Records

The HWM Division Leader is responsible for all QA records compiled by HWM. The Division Leader may delegate this responsibility to Group Leaders, as appropriate. Each Group Leader may designate a "Responsible Person" to maintain a QA Records File.

MDD QA Records

For MDD, Group Leaders are responsible for the QA records related to their assigned work, and the Division Leader is responsible for all other QA records. Each Group Leader establishes a QA Records File and designates a "Responsible Person" to maintain the file.

QA Duties of the Responsible Person

The "Responsible Person " who maintains the QA Records File, must at minimum:

- Check submitted records for date and issuer's signature, and identify or accept documents as QA records
- Index and file QA records in a manner that facilitates retrieval and prevents damage or loss
- Control the removal of QA records from the file.

Additional requirements are described in the individual HMPT QA Plans (M-078-91, M-078-92, M-078-93).

15. References

This Reference section provides a listing of applicable references, including LLNL manuals and guidance documents, DOE Orders, federal and state regulations, industrial and government standards, government and industrial guidelines, and waste acceptance criteria which apply to the HMPT Safety Program. In each instance, reference is made to the latest edition.

LLNL Procedures Manuals and Planning Documents

Hirabayashi, J. *Guidelines for Waste Accumulation Areas* . In *Environmental Protection Handbook.* Lawrence Livermore National Laboratory, Livermore, CA, UCAR-10192, Rev. 1.

Lawrence Livermore National Laboratory. *Criteria and Procedures for the Certification of Non-Radioactive Hazardous Wastes.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Environmental Compliance Manual.* Lawrence Livermore National Laboratory, Livermore, CA, UCRL-MA-118090.

Lawrence Livermore National Laboratory. *Environmental Protection Handbook.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Hazardous Waste Management Quality Assurance Plan.* Lawrence Livermore National Laboratory, Livermore, CA, M-078-92.

Lawrence Livermore National Laboratory. *LLNL Emergency Preparedness Plan.* Lawrence Livermore National Laboratory, Livermore, CA, February, M-014, Rev. 3.

Lawrence Livermore National Laboratory. *LLNL Health and Safety Manual.* Lawrence Livermore National Laboratory, Livermore, CA, M-010-90.

Lawrence Livermore National Laboratory. *LLNL Quality Assurance Program for Hazardous Material Packaging and Transportation,* Supplement 1. Lawrence Livermore National Laboratory, Livermore, CA, M-078 and Supplement 1.

Lawrence Livermore National Laboratory. *Materials Control and Accountability Manual.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Materials Distribution Quality Assurance Plan for Hazardous Material Packaging and Transportation.* Lawrence Livermore National Laboratory, Livermore, CA, M-078-93.

Lawrence Livermore National Laboratory. *Materials Management Division Sealed Source Program and Procedures Manual.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Materials Management Quality Assurance Plan for Hazardous Material Packaging and Transportation.* Lawrence Livermore National Laboratory, Livermore, CA, M-078-91.

Lawrence Livermore National Laboratory. *Nuclear Material Control and Accountability Program Manual.* Volumes I through VII. Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Preparation Guide for Generators of Hazardous Chemicals, and Radioactive Waste at LLNL.* Lawrence Livermore National Laboratory, Livermore, CA.

LLNL Operational Safety Procedures and Facility Safety Procedures

Facility Safety Procedure (FSP) for Buildings 231 Vault, 232 Fenced Compound, 233, 234 General Operations, FSP-233.

Contains facility safety procedures for Materials Management Division facilities. FSP 233, Appendix D, is a procedure for loading and transportation of explosives at the Main Site.

Lawrence Livermore National Laboratory. *Hazardous Waste Management Division Operational Procedures.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. Hazardous Waste Management Division. *Hazardous Waste Management Division Facility Safety Procedures (FSP).* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. Hazardous Waste Management Division. *Hazardous Waste Management Division Operational Safety Procedures (OSP).* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Site 300 Safety and Operational Manual* . Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Supply and Distribution Department Procedures Manual.* Volumes 2 through 4. Lawrence Livermore National Laboratory, Livermore, CA.

LLNL Committee Charters

Environment, Safety, & Health /Quality Assurance Council Charter

Describes the charter of the ES&H/QA Council.

Environment, Safety, & Health /Quality Assurance Working Group Charter

Describes the charter of the ES&H/QA Working Group.

HMPT Safety Committee Charter

Describes the charter of the Hazardous Material Packaging and Transportation Safety Committee.

Relevant LLNL Reports

LLNL Report on Administrations and Operations Employee Handling, Transportation, and Storage of High Explosive Materials.

Reports on findings from an explosives subcommittee on explosives operations within the Plant Operations Directorate.

Preliminary Hazards Analysis for the Materials Management Facilities

Documents the analyses used to determine hazards classifications for Materials Management Division facilities.

Safety Analysis Document for the Hazardous Waste Management Facilities

Documents the analyses used to determine hazards and risks for operation of Hazardous Waste Management Division facilities.

Applicable Government Orders, Standards, and Guidelines

American National Standards Institute. N14.5. Leakage Tests on Packages for Shipment of Radioactive Materials

American National Standards Institute. NQA-1. Quality Assurance

California Code of Regulations, Title 22, Articles 9 and 11 (22 CCR 9 and 11).

California Code of Regulations, Title 22, Hazardous Wastes and Hazardous Materials (22 CCR).

Code of Federal Regulations, Title 10, NRC Guidelines (10 CFR 71).

Code of Federal Regulations, Title 29, OSHA Regulations and Health Hazards Communication (29 CFR).

Code of Federal Regulations, Title 40, Part 761, EPA Regulations/TOSCA (40 CFR 761).

Code of Federal Regulations, Title 40, Parts 260-265, Environmental Protection Act Regulations/Resource Conservation and Recovery Act (40 CFR 260-265).

Code of Federal Regulations, Title 48, U.S. Department of Energy Contractual Provisions, (48 CFR).

Code of Federal Regulations, Title 49, Parts 100-199, U.S. Department of Transportation Regulations (49 CFR 100-199).

International Atomic Energy Agency Safety Series No. 6, *Regulations for the Safe Transport of Radioactive Material.*

MLM 3245, Monsanto Spec 7A Container Certification Document.

Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements. NVO-325,

Nuclear Regulatory Commission (NRC) Regulatory Guide 7.10

TRU Waste Acceptance Criteria for Certification of TRU Waste for Shipment to WIPP, WIPP-DOE-069.

TRU Waste Certification Compliance Requirements of Newly Generated Contact-Handled Wastes to be Shipped to the WIPP. WIPP-DOE-114.

U.S. Department of Energy (DOE). 1995. Order 232.1, *Occurrence Reporting and Processing of Operations Information.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). *Explosive Safety Manual.* U.S. Department of Energy, Washington, D.C., DOE/EV/06194-3.

U.S. Department of Energy (DOE). Order 1540.1, *Materials Transportation and Traffic Management.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 1540.2, H*azardous Material Packaging for Transportation Administration Procedures.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 3790.1A, *Federal Occupational Safety and Health Administration.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 3791.2A, *Federal Employee Motor Vehicle Safety Program.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5400.3, *Hazardous and Radioactive Mixed Waste Program* . U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.1B, *Environmental, Safety, and Health Programs for DOE Operations.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.11. U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.16, *Firearms Safety.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.2, *Hazardous and Radioactive Mixed Waste Management*. U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.3, *Safety Requirements for Packaging and Transportation of Hazardous Material.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5480.5, *Safety of Nuclear Facilities.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5482.1B, *Environmental, Safety, and Health Appraisal Program.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5500.1A, *Emergency Management System.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5500.2A, *Emergency Notification, Reporting, and Response Levels.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5610.12, *Packaging and Offsite Transportation of Nuclear Components and Special Assemblies Associated with the Nuclear Explosive and Weapon Safety Program.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5633.3B. U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5700.6C, *Quality Assurance.* U.S. Department of Energy, Washington, D.C.

U.S. Department of Energy (DOE). Order 5820.2A, *Radioactive Waste Management.* U.S. Department of Energy, Washington, D.C.

16. Acronyms

AD — Associate Director

ALARA — As Low As Reasonably Achievable

ANSI — American National Standards Institute

CCR — California Code of Regulations

CFR — Code of Federal Regulations

CHP — California Highway Patrol

CMID — Controlled Material Identification (Tag)

DOE — U.S. Department of Energy

DOT — U.S. Department of Transportation

DTSC — Department of Toxic Substances Control

EBW — Exploding bridgewire

EPA — Environmental Protection Agency

EPD — U.S. Environmental Protection Department

ES&H — Environmental, Safety, and Health

ES&H/QA — Environmental, Safety, and Health/Quality Assurance

FSP — Facility Safety Procedure

HC — Hazards Control Department

HE — High Explosive

HMPT — Hazardous Materials Packaging and Transportation

HMPTC — Hazardous Material Packaging and Transportation Safety Committee

HMX — Tetranitro tetrazacycloctane

HWM — Hazardous Waste Management Division

ID — Identification

LEDO — Laboratory Emergency Duty Officer

LEI — Low energy initiator

LLNL — Lawrence Livermore National Laboratory

LLW — Low Level Waste

MDD — Materials Distribution Division

MMED — Materials Manufacturing Engineering Division

MMS — Materials Management Section

MSDS — Material Safety Data Sheet

MOUT — Material of Unknown Toxicity

NELA — Nuclear Explosive Line Assembly

NET — Net explosives weight

NRC — Nuclear Regulatory Commission

ORM — Other regulated materials

OSHA — Occupational Safety and Health Administration

OSP — Operational Safety Procedure

PCB — Polychlorinated Biphenyl

PARIS — Procurement Accounting Receiving Information System

PETN — Pentaerythritol tetranitrate

PSO — Protective Services Officer

Q — Refers to a level of security clearance

QA — Quality Assurance

RCRA — Resource Conservation and Recovery Act

RDX — Trinitro triazacyclohexane

RQU — Research Quantity, internal to LLNL and Site 300

SARA — Superfund Amendments and Reauthorization Act

SARP — Safety Analysis Report on Packaging

SCG — Storage compatibility grouping

SC/HC — Storage Compatibility/Handling Control

SDD — Services and Distribution Department

SNM — Special Nuclear Materials

TNT — Trinitrotoluene

TSDF — Treatment, Storage, and Decontamination Facility

TRU — Transuranic

UNO — United Nations Organization

WAA — Waste Accumulation Area

WDR — Waste Disposal Requisition